The New Scholasticism

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Philosophy in a National Emergency

An Editorial

DURING WORLD WAR II, the immediate need for trained specialists made philosophy an expendable subject in the college curriculum. In the present and apparently long national emergency, the fate of philosophy—and of liberal education generally—cannot be decided on the same terms. For while the formal study of sound philosophy can be sacrificed for the short-range objective of winning a war, it cannot be sacrificed permanently lest it cost the long-range values that make wars worth winning.

Paradoxically enough, the philosophy which the national emergency threatens in the curriculum is the same one that is being tested in the present world-wide crisis. Wars are fought for peace, and peace can best be promoted in the colleges by the emphasis on that wisdom whose office it is to order. The aim of our defense program is security, but there can be no economic or political security without the security of ultimate and unchanging truth. On a short-term basis, the potential philosophers may be mobilized for the common good. But where a national emergency threatens to last through a generation or more, the common good requires a close analysis and a calm re-affirmation of the long-term principles of our cultural

heritage. That is why philosophy must survive in the curriculum if culture is to survive in our society.

If the present world tension involved only the western nations struggling against Russia and her satellites, the problem of sacrificing philosophy in our colleges would not be so serious. But there are challenges to the United States on the home front, and there is a danger that the potential leaders of our country may be permanently undernourished for their task by a lack of training beyond the engineering or managerial level.

The expansion of the armed services together with the multiplication of government agencies offers immediate opportunities to graduates of technical departments and commerce colleges. Such facts have prompted the increasing interest of the college student in the practical rather than liberal curriculum. Students pursuing liberal studies often feel, rightly or wrongly, that their education will penalize them in the national emergency and that in a more selective deferment they are likely to suffer most while the physicists and chemists are privileged to complete their education. The present policy of selective service accords no special status to any one group of undergraduates, but the feeling exists among liberal arts underclassmen that they will be the first to be called up if prevailing draft practices are changed.

At the graduate level, there has been a large percentage of veterans who have been able to pursue their studies in the assuring status of legal exemption from the draft. However, that percentage of graduate students has dwindled during this fall semester, and under prevailing draft policy, the graduate departments of philosophy are likely to suffer even more than liberal arts colleges. This will mean a setback for the values that our national emergency would preserve. Unless due consideration is given to the liberal curriculum by all those who have a hand in present draft policies, the leadership of America in various fields is not likely to match our present position as a political and military leader of the western world.

In Defense of the Square of Opposition

by John J. Doyle

IN A THOUGHTFUL article in THE NEW SCHOLASTICISM of January, 1950, Dr. Paul Jacoby develops a Triangle of Opposites, which he proposes as a substitute for the Square of Opposition that has become conventional in the explanation of some of the relations among propositions. There is no doubt that this interesting article does throw light upon certain relationships that ought to be recognized and that teachers of logic sometimes neglect to call to the attention of their students. The Triangle contains in its three corners the propositions (1) "All S is P," (2) "No S is P," and (3) "Some S is P and some S is not P." [1] It is evident that in every case one of these propositions must be true, and that no more than one of them can in any case be true. Consequently, in a given case, the acceptance of any one of them necessitates the rejection of the other two; the rejection of any two of them necessitates the acceptance of the third; the rejection of any one of them necessitates the alternative acceptance of the other two; and the alternative acceptance of any two of them necessitates the rejection of the third.

It is well to have these implications made explicit, and teachers of logic will be grateful to the author for having presented them so clearly. Nevertheless, while I gladly accept Dr. Jacoby's Triangle as a supplement to the Square, I do not believe that it can replace the latter. The reasons for my position are (1) that the Triangle mingles simple and composite propositions indiscriminately and is therefore something of a

[1] P. Jacoby, "A Triangle of Opposites for Types of Propositions in Aristotelian Logic," THE NEW SCHOLASTICISM, XXIV (1950), 46.

hybrid, whereas the Square shows the relationships that obtain among simple propositions; and (2) that the Triangle fails to show or shows only obscurely some of the relationships that the Square sets forth in a clearcut manner.

I. The Triangle Mingles Simple and Composite Propositions

My first objection brings me into direct opposition with one of the central points of Dr. Jacoby's article. He avers that anyone attempting to construct a figure showing the relationships among categorical propositions is confronted with a dilemmatic situation, since, no matter what interpretation he gives to the particular proposition, that proposition will always be composite. If this is so, then the Square of Opposition, no less than the Triangle of Opposites, is a hybrid and I shall be lacking in at least one of my reasons for retaining the former. My contention, on the contrary, is that the four propositions of the conventional Square are all truly simple, and consequently that the Square is a pure figure deserving of a place in the exposition of logic.

Dr. Jacoby acknowledges that if "Some S is P" is understood to mean "Only some S is P," it is, though apparently simple, really a composite proposition, equivalent to "Some S is P and some S is not P."[2] But he contends that if "Some S is P" is understood in the indefinite, noncommittal sense of the I proposition of the conventional Square, it is no less a composite proposition, meaning either "Only some S is P or all S is P" or "Some S is P and possibly all S is P."[3] It is my belief that the latter propositions are in reality simple, their grammatical composition concealing their logical simplicity, as in the other case the grammatical simplicity conceals the logical composition. Dr. Jacoby treats this question at considerable

[2] *Art. cit.*, p. 39.

[3] *Art. cit.*, p. 39-40.

length, and indeed bases his entire argument for the abandonment of the Square upon his analysis. I should like to set forth in some detail the reasons for my belief.

First of all, I would observe that the proposition, " Some S is P," if taken literally, seems to state a single fact, and this fact is apparently simple. The same observation may be made of " Not all S is P." Each of these seems to set forth one fact or belief, with no modification or qualification such as the adverb " only " attaches to the meaning of " some " in the sentence, " Only some S is P." If each of the words of the proposition is understood in its accepted meaning, the proposition as a whole seems to be simple.

Yet Dr. Jacoby appears to believe that the meaning of " Some S is P " must be explained by the expansion of the proposition either into the form, " Some S is P and possibly all S is P," or into the form, " Only some S is P or all S is P." He concludes, therefore, that, whether one understands the particular proposition in the indefinite sense or in the definite sense, one has always a composite proposition on one's hands. He goes on to state: " If Aristotle had been confronted with such a dilemma, it is not likely that he would have considered a pair of contradictories to consist of simple propositions." [4] Now it seems to me that, in the very nature of the case, a pair of contradictories must be either both simple or both composite. It is difficult for me to see how a composite proposition could stand in the relation of contradiction to a simple one; and it is even more difficult to see how a simple proposition could contradict a composite one. For a composite proposition must have reference to more than one fact and a simple proposition has reference to but one. How, then, could the latter contradict the former? Even if Aristotle had adopted such a position, I should feel constrained to differ from his view in the matter.

This does not seem to be the position taken by Aristotle, how-

[4] *Ibid.*

ever. As a matter of fact, he appears to have expressed the same doctrine that I defend. In *De Interpretatione* he wrote: "It is evident that the denial corresponding to a single affirmation is itself single." [5] A little further on he wrote: "We have shown that a single denial is contradictorily opposite to a single affirmation." [6] And in the following paragraph:

> An affirmation or denial is single, if it indicates some one fact about some one subject. . . . Such single propositions are 'every man is white,' 'not every man is white,' 'man is white,' 'man is not white,' 'no man is white,' 'some man is white,' provided the word 'white' has one meaning. [7]

There is another passage that is even more explicit in the matter. In Chapter 11 of the same work, Aristotle discussed propositions that are really composite, though apparently simple.

> There is no unity, he wrote, about an affirmation or a denial which, either positively or negatively, predicates one thing of many subjects, or many things of the same subject, unless that which is indicated by the many is really some one thing. . . . If, therefore, the dialectical question is a request for an answer, i. e., either for the admission of a premise or for the admission of one of two contradictories—and the premise is always one of two contradictories—the answer to such a question cannot be a single proposition. [8]

What Aristotle seems to have meant here is that, if a person is asked whether he admits the truth of a composite proposition, his answer, be it in the affirmative or be it in the negative, is necessarily a composite proposition. Even should his answer be only "Yes" or "No," it would be the equivalent of a composite proposition. Now according to the doctrine proposed by Dr. Jacoby, the contradictory of a simple universal proposition is a composite proposition. In such a case, the contradictory of the latter is the simple universal proposition. It would follow, then, that anyone asked whether he accepted the composite

[5] Aristotle, *De Interpretatione*, chap. 7.
[6] *Ibid.* [7] *Op. cit.*, chap. 8. [8] *Op. cit.*, chap. 11.

proposition could give a negative answer by merely stating the simple universal proposition. The answer to the question whether he accepted the composite proposition would thus be a simple proposition, which Aristotle declared to be impossible. Hence the supposition that Aristotle would not have considered a pair of contradictories to consist of simple propositions seems to be overthrown by what Aristotle himself wrote.

Regardless of Aristotle's views, however, I believe that it may be demonstrated that the propositions I and O, the contradictories of E and A, are really simple and not composite. Dr. Jacoby argues as follows:

> . . . the meaning 'at least some' includes the possibility of the attribute being present in or predicable of all individuals of which the subject of the 'particular' proposition is predicable, so that the expression means 'one or more . . . and possibly all . . .' logical inferiors of the universal subject (S) have the attribute which is represented by the predicate-term (P). . . . But it would seem that this likewise means a type of composite or copulative proposition; for, if the universal proposition is a simple affirmation or a simple denial, then the contradictory proposition . . . will be composite rather than simple, since it means 'Some only *or* all. . . .'[9]

This argument seems to run counter to the statements of Aristotle that I have previously quoted. Nevertheless, I should like at this point to submit to further examination the denials called by Dr. Jacoby composite.

Two forms are suggested for the supposed composite propositions contradicting the negative "No S is P." These are: "One or more and possibly all S is P" and "Only some S is P or all S is P." The first of these might be understood in either one of two ways; it must therefore be examined to ascertain which of these is the proper one in the present context. "Possibly all S is P" might mean "I do not know whether all S is P or not." I think that this interpretation has to be eliminated for

[9] P. Jacoby, *loc. cit.*

two reasons. In the first place, this sentence says nothing about the S that is under discussion, but is rather a statement concerning the person formulating the proposition. In the second place, the sentence taken in this sense would not always be true. For a person that knows that all men are rational can utter the proposition, "Some men are rational," and a person that knows that some men are not white can utter the proposition, "Some men are white." In both cases, it would be false for him to say, "I do not know whether all S is P." The alternative interpretation of "possibly all S is P" is "Either all S is P or not all S is P." This is evidently the one that must be accepted here. The complete composite proposition suggested as the contradictory of "No S is P" must therefore be: "Some S is P and all S is P or some S is not P."

The other suggested form for this composite proposition is: "Only some S is P or all S is P." Now it is acknowledged that "Only some S is P" is itself a composite proposition, meaning, "Some S is P and some S is not P." If this full statement of the signification of that phrase be substituted for its curtailed form, the proposition will read: "Some S is P and some S is not P or all S is P." This is evidently the same proposition arrived at in the preceding paragraph by the analysis of the first form, for the difference in the order of the members is inconsequential.

Furthermore, it will be noted that this same proposition is arrived at by Dr. Jacoby in the conclusion of his analysis as one of the "Disjunctions" to be discovered in figure (e): "not $-2 \equiv 3$ or 1."[10] In figure (e) "2" designates "No S is P," "3" designates "Some S is P and some S is not P," and "1" designates "All S is P." The formula, "not $-2 \equiv 3$ or 1," may therefore be read: "The contradictory of 'No S is P' is 'Some S is P and some S is not P or all S is P.'" Here again, then, is the identical "composite" proposition,

[10] P. Jacoby, *art. cit.*, p. 46.

given as the contradictory of E, that resulted from the analysis of the other suggested forms. The identity of these is evidence of the consistency of Dr. Jacoby's thinking.

The question I would raise, however, is this: Is this really a composite proposition? As I have remarked before, there is no question but that it is a compound *sentence*. Yet, if it is closely scrutinized, I think that it will be discovered to convey only so much information as that some S is P. For, besides the component, "Some S is P," what else does the supposed composite proposition contain? No more than "Some S is not P or all S is P." This is manifestly but a statement of the principle of the excluded middle. Whether all S is P or no S is P or some S is P and some S is not P, it is always true that all S is P or some S is not P. Even a person knowing nothing at all about the relation of S and P knows that either all S is P or some S is not P. If anyone should say: "Some men are white and all men are white or some men are not white," the only positive information that he would convey would be that some men are white. As to the words, "some men are not white or all men are white," they do not seem to me to be a proposition in the strict sense concerning men, but only a formulation of the principle of the excluded middle in concrete terms. The complete proposition that contradicts "No S is P" is therefore the simple proposition, "Some S is P."

There is another way of making this demonstration. For, if the proposition I is indeed composite, then its contradictory, E, must also be composite. The contradictory of "Some S is P and some S is not P or all S is P" is "No S is P or neither some S is not P nor all S is P." This proposition may be reworded to read: "No S is P or all S is P and some S is not P." This is precisely the conclusion reached by Dr. Jacoby in the second of his "Conjunctions," which reads: "2 ≡ not — 3 and not — 1."[11] This may be construed as follows: "The

[11] *Ibid.*

equivalent of 'No S is P' is 'Some S is not P and all S is P or no S is P.'" Although the order in which the members occur differs, there is obviously no difference in the sense of this sentence and that of the one given above. Since "Some S is not P and all S is P" constitutes an absurdity, the only meaning that the sentence has is "No S is P." Since the contradictory of "Some S is P and some S is not P or all S is P" is shown to be in reality a simple proposition, the proposition itself must be really simple.

Dr. Jacoby does not develop the meaning of "Not all S is P," the contradictory of "All S is P." If he did so, he would doubtless say that it is also a composite proposition having the meaning: "Not all S is P and possibly no S is P" or "Only some S is not P or no S is P." These sentences could be shown to amount to "Not all S is P and no S is P or some S is P" or "Not all S is P and some S is P or no S is P," which are obviously identical in meaning. The first of the "Disjunctions" based upon figure (e) is the following: "not $-1 \equiv 2$ or 3."[12] This can be read: "The contradictory of 'All S is P' is 'No S is P or some S is P and some S is not P.'" These three formulations of the contradictory of A are evidently identical, each consisting of the simple proposition, "Some S is not P," with the addition of the necessarily true statement, "No S is P or some S is P." Here again, then, a simple proposition is the contradictory of the universal proposition.

It would appear, therefore, that the first two "Disjunctions" resulting from the Triangle of Opposites merely present the relationship of contradiction between A and O and between E and I in a somewhat roundabout manner. The same may be said of the first two "Conjunctions." But I have made the charge that the Triangle indiscriminately mingles simple and composite propositions. Where, then, are the composite propositions? In the first two "Disjunctions" both members con-

[12] *Ibid.*

nected by the symbol " ≡ " have been shown to be really simple, although the one to the left is apparently composite. In the third, on the other hand, although again the left-hand member is presented as if it were simple and the right-hand member as if it were composite, both members are in truth composite. It reads: " not — 3 ≡ 1 or 2." This can be interpreted as follows: " The contradictory of ' Some S is P and some S is not P ' is ' Either all S is P or no S is P.' " Unlike the members of the other " Disjunctions," both the propositions here placed in contradiction are really composite. Nor is there any escaping the fact that they are true contradictories; for the truth of each implies the falsity of the other and the falsity of each implies the truth of the other.

Dr. Jacoby appears to be somewhat disappointed to have been led by his investigation to the formulation of this relationship. He remarks in a footnote:

> Expressing as they do the formal aspect of contradictory alternatives provided by the law of contrariety, ' I · ~A ' (i. e., ' ~E · ~A ') and ' A ∧ E ' are not to be interpreted as material contradictories. Yet they are not the formal contradictories, ~p · ~q and p ∨ q of the modern calculus of propositions, either.[13]

In view of his professing to seek a " complete evaluation of the fundamental points of similarity as well as difference " in Aristotelian and symbolic logic,[14] it strikes me as strange that he should disclaim any similarity between the conclusions to which his analysis of Aristotle's doctrine has led him and the teachings of the modern logicians. It is not easy to say just what he means by denying that " I · O " and " A ∧ E " are material contradictories and also that they are the formal contradictories of the modern calculus. Surely, if they are contradictories, they must be either formally or materially such. Perhaps he means that they are formal contradictories but of a different

[13] *Art. cit.*, p. 44.

[14] *Art. cit.*, p. 33.

sort from those of the modern logicians.[15] At any rate, it seems to be borne out by Dr. Jacoby's analysis that the conjunctive (or copulative) proposition has for its formal contradictory an alternative proposition. This conclusion seems to be inevitable from an examination of the "Disjunctions" and "Conjunctions" that he derives from the Triangle. These are presented in the following form:[16]

[16] *Art. cit.*, p. 44.

Disjunctions	Conjunctions
not — 1 ≡ 2 or 3	1 ≡ not — 2 and not — 3
not — 2 ≡ 3 or 1	2 ≡ not — 3 and not — 1
not — 3 ≡ 1 or 2	3 ≡ not — 1 and not — 2

Now it is evident that "not — 1" and "1" are contradictories. But "2 or 3" is presented as the equivalent of "not — 1" and "not — 2 and not — 3" is presented as the equivalent of "1." Hence "2 or 3" must be the contradictory of "not — 2 and not — 3." In like manner, "3 or 1" is the contradictory of "not — 3 and not — 1"; and "1 or 2" is the contradictory of "not — 1 and not — 2." The conclusion from this analysis seems to be that the conjunctive proposition must have an alternative proposition or its equivalent for its contradictory.

That a conjunctive proposition cannot be contradicted by

[15] It may be that Dr. Jacoby finds a difference between the example of contradiction here brought to light and that of the modern logicians in the fact that his "A ∧ E" is a "disjunctive" proposition in the sense that its members are not only exclusive of a middle, but mutually exclusive also, whereas the "p V q" of the modern logicians has members that are not mutually exclusive. In such a case, however, "A ∧ E" is not a single proposition but a conjunction, which should be read: "Not both A and E and either A or E." But it should be noted that the I and O propositions are exclusive of a middle just as truly as the A and E are mutually exclusive. Hence the contradictory of his proposition is really: "Neither O nor I or both O and I." But since "Not both A and E" is a necessarily true proposition and "Neither O nor I" is a necessarily false one, the two contradictories reduce themselves to "Either A or E" and "Both I and O," which appear to be equivalent to the contradictories of the modern logicians.

another conjunctive proposition seems to follow from its very nature. For a conjunctive proposition is necessarily categorical and bears an analogy to the universal proposition in that it is true only if each of its members is true, just as an A proposition is true only if P characterizes all the instances of the S. And just as the A proposition cannot be formally contradicted by another universal proposition, so the conjunctive proposition cannot be formally contradicted by another conjunctive proposition, or even by another categorical proposition. I do not say that it cannot be denied by such a proposition; there are in fact several ways in which it may be denied. But besides mutual exclusivity, the relation of contradiction requires that the propositions in question should between them exhaustively state the possibilities, that is, that they should exclude a middle. Perhaps this principle can be made plain by an example. Suppose that someone asserts, "Both capitalism and communism are immoral." This proposition can be denied in the following ways:

(1) Neither capitalism nor communism is immoral.
(2) Capitalism is immoral but communism is not immoral.
(3) Communism is immoral but capitalism is not.
(4) Capitalism is not immoral.
(5) Communism is not immoral.
(6) Either capitalism is not immoral or communism is not immoral.

There does not seem to be any other proposition that is a denial of the given proposition, that is, one the truth of which implies the falsity of the given proposition. It seems to be obvious, on the other hand, that none of the first five denials is the contradictory of the given proposition; for though none of them could be true if the given proposition were true, every one of them could be false if the given proposition were false. Thus, if capitalism were immoral and communism were not, (1), (3),

and (4) would be false as well as the given proposition; if communism were immoral and capitalism were not, then (1), (2), and (5), would be false as well as the given proposition; and if neither capitalism nor communism were immoral, then (2) and (3) would be false as well as the given proposition. Hence not one of these would be true in every case in which the given proposition would be false.[17] Denial (6), on the other hand, not only would be false if the given proposition were true; it would necessarily be true in every case in which the given proposition would be false. Whether neither capitalism nor communism is immoral, or capitalism is immoral and communism is not, or communism is immoral and capitalism is not—that is to say, under whatever conditions the proposition, "Both capitalism and communism are immoral," is false—"Either capitalism or communism is not immoral" is true. Thus the contradictory of a conjunctive proposition must be other than a conjunctive proposition, and indeed other than a categorical proposition.

This is precisely the conclusion arrived at in Dr. Jacoby's analysis. I have attempted to show that his first and second composite propositions are in their significance simple. Nevertheless, it is their form that is here under consideration; and in that the conjunctive proposition is found always to have an alternative contradictory.

Up to this point I have been attempting to show that the Triangle of Opposites suffers from being composed of mixed elements—simple and composite propositions. It behooves me now to vindicate the Square of Opposition as containing only simple propositions. Dr. Jacoby does seem to accept the particular propositions as simple, provided that they are under-

[17] This analysis is in agreement with Dr. Jacoby's in that a simple proposition seems to stand in the relation of contrariety to a composite one, as, for instance, (4) and the given conjunctive proposition. It is not my purpose to deny that such is the case. I am only interested in showing the awkardness of mixing simple and composite propositions in one diagram.

stood as mere denials of the universal propositions. Thus he writes:

> . . . a *particular* proposition (which should not be interpreted as an explicit assertion about one or several individuals) must be a denial of the definite connection of thing and attribute . . . expressed by the universal proposition with respect to a universal subject. Thus a truly Aristotelian interpretation of any of the four types . . . must regard such a proposition as a statement formally made with respect to a universal, and *only virtually* with respect to the logically inferior *individuals*.[18]

He is here explaining a passage in Aristotle, which reads:

> . . . the denial must deny that which the affirmation affirms concerning the same subject, and must correspond with the affirmation both in the universal or particular character of the subject and in the distributed or undistributed sense in which it is understood.[19]

While this passage presents some difficulties, I do not believe that it should be interpreted to mean that the particular proposition is only a denial without any positive signification at all. It is true that, since the relation of contradiction is a symmetrical one, either of a pair of contradictories may be said to be the denial of the other. Nevertheless, Aristotle did not ordinarily speak of the particular affirmative as a denial of the universal negative; he rather called the negative proposition, whether universal or particular, the denial of the affirmative of opposite quantity. Thus he wrote: "The denial proper to the affirmative 'every man is white' is 'not every man is white,' that proper to the affirmative 'some men are white' is 'no man is white.'"[20] Thus he seems to have accepted the particular affirmative as having a status of its own and not to have relegated it to the position of a mere denial of the universal negative. There is no reason to suppose that he considered the particular negative to be a mere denial, unless one is willing to conclude that he put the universal negative in the position of a

[18] *Art. cit.*, p. 41. [19] Aristotle, *op. cit.*, chap. 7. [20] *Ibid.*

mere denial of the particular affirmative, without any positive signification of its own.

Some of Dr. Jacoby's confusion seems to arise from the fact that "universal" is used by Aristotle in two distinct senses: (1) he applies it to the *subject* of the proposition to distinguish that from the individual term that is the subject of the individual proposition; and (2) he applies it to the *proposition* that has its universal subject distributed, to distinguish that from the particular proposition, whose universal subject is undistributed. These two meanings are illustrated in the following passage:

> If, then, a man states a positive and a negative proposition of universal character with regard to a universal, these two propositions are contrary. . . . When, on the other hand, the positive and negative propositions, though they have regard to a universal, are yet not of universal character, they will not be contrary, albeit the meaning intended is sometimes contrary. . . . An affirmative is opposed to a denial in the sense which I denote by the term 'contradictory,' when, while the subject remains the same, the affirmation is of universal character and the denial is not.[21]

It seems evident that when in this passage Aristotle wrote, "with regard to a universal" and "have regard to a universal," he meant what I have designated (1) above, that is, a subject that is universal and not individual. When he wrote "proposition of universal character," he had reference to what I have designated (2), that is, a proposition having its universal subject distributed. A proposition not of universal character would of course be one in which the universal subject is not distributed.

It seems to me also that the passage quoted by Dr. Jacoby must be interpreted in the light of this passage; that is to say, when Aristotle wrote, "The denial . . . must correspond with the affirmation . . . in the distributed and undistributed sense in which it is understood," he meant to say that if the affirma-

[21] *Ibid.*

tion is understood in the distributed sense, the denial is to be understood in the undistributed sense. To have required that they both be understood in the distributed sense or both in the undistributed sense would not only have been unreasonable but would have been in conflict with his own prescription: "while the subject remains the same, the affirmative is of universal character and the denial is not." The same principle applies to another statement of Aristotle quoted by Dr. Jacoby: "The identity of subject and predicate must not be equivocal." [22] The identity here demanded is identity of connotation, not identity of denotation; the same universal term must be the subject of both contradictories, but it must not be the same in denotation in both. As Aristotle explained a few lines further on, "the word 'every' does not make the subject universal but rather gives the proposition a universal character." [23]

That Aristotle did recognize the I and the O propositions as having a meaning of their own and did not regard them as mere denials of the E and the A propositions seems also to be indicated by his referring to the fact that these propositions can sometimes both be true: ". . . the contradictories of a pair of contraries can sometimes both be true with reference to the same subject; for instance, 'not every man is white' and 'some men are white' are both true." [24] Aristotle seems here to have adopted the elliptical form of common speech, suggesting that sometimes also such propositions are not both true. It would be hard to reconcile this passage with the opinion that he understood "Some S is P" to mean "Only some S is P." It would seem, therefore, that Aristotle did understand the I and the O propositions in substantially the same sense in which they are understood in the conventional Square of Opposition. He seems to have taken them to have a meaning such that sometimes they are both true (that is, when their contradictories are both false)

[22] P. Jacoby, *art. cit.*, p. 40. Aristotle, *op. cit.*, chap. 6.
[23] Aristotle, *op. cit.*, chap. 7. [24] *Ibid.*

and sometimes one is true and the other false (that is, when the contradictory of the one is false and of the other, true), but never are they both false (since their contradictories are never both true). It is to be regretted that he nowhere called attention explicitly to this third circumstance; it is certainly implicit in what he wrote. Whether he failed to notice it or considered it too obvious or too trivial to mention, it is, of course, impossible to say.

Perhaps Dr. Jacoby has been led into disvaluing the I and O propositions by the elliptical manner of ordinary speech, used by Aristotle himself in the passage quoted in the last paragraph. What can be understood without being said is usually, in the interest of economy, not said. Thus, for example, arguments are generally proposed in the form of enthymemes rather than of complete syllogisms, simply because the omitted premise will be understood or read between the lines, as the saying is. In like manner, a person making a statement in the form, "Some S is P," generally wishes to suggest that some S also is not P. For, in the majority of cases, if he knew that all S is P, he would say so. Such usage is perfectly proper in conversation and even in scientific discourse, so long as there is no danger of misunderstanding. But it ought to be recognized that it is an elliptical usage. If a person says, "Some grocers are honest," or "Some text books are interesting," meaning to suggest that some grocers are not honest or that some textbooks are not interesting, he is really giving voice to a conjunctive proposition in an elliptical way.

Though this is the usual manner of speech, there are circumstances, nevertheless, in which the particular proposition should be understood to mean just what it says and not something else over and above what it says. One such circumstance is that in which the speaker does not know whether the subcontrary proposition is also true; another is that in which the truth of the subcontrary is not of any moment. Suppose that invitations

to a party have been sent to all the members of a class or club. Suppose that all the replies received within the first day or two are acceptances. The prospective host could then say with confidence: "Some of those invited will come." He could not say whether all will come or some will not come; but his statement would be a true one and would not be rendered untrue whatever the event might disclose as to the truth of its subcontrary. Suppose a person to come upon the college at which I have the honor to teach during a class period when none of the students is visible. He might wonder concerning the nature of the student body. Should the bell ring as he stood there and the students begin to emerge from their classes, he would immediately be able to say: "Some of the students are not men," but he would not have any warrant for any more definite statement. The truth of this proposition would not be affected by his subsequent discovery that not one of the students is a man.

II. Advantages of the Square of Opposition

My second contention is that the Triangle of Opposites either fails to show at all or fails to show clearly the relationships among propositions that the Square of Opposition presents with precision and perspicuity. It remains for me, therefore, to discuss these relationships and to show how they are symbolized in the Square.

Dr. Jacoby professes to confine himself to contradiction and contrariety, relegating subalternation and subcontrariety to the limbo of the non-aristotelian. It might be expected, therefore, that the Triangle would show contradiction and contrariety with extraordinary lucidity. Such does not seem to be the case, however. It would appear that contradiction is meant to be symbolized as obtaining between a proposition on any corner of the large triangle and the proposition on the opposite corner of the small triangle in Figure (e). The verbalization of these

positions would then be contained in the " Disjunctions." These are:

$$\text{not} - 1 \equiv 2 \text{ or } 3$$
$$\text{not} - 2 \equiv 3 \text{ or } 1$$
$$\text{not} - 3 \equiv 1 \text{ or } 2$$

The first of these states that the denial of " 1 " is equivalent to the affirmation of " 2 or 3." This is, of course, a way of stating that " 1 " and " 2 or 3 " are contradictories: if " 1 " is false, then " 2 or 3 " is true, and if " 1 " is true, then " 2 or 3 " is false. In like manner, " 2 " is presented as the contradictory of " 3 or 1 " and " 3 " is presented as the contradictory of " 1 or 2." I have already pointed out that " 2 or 3 " and " 3 or 1," though presented as composite propositions, are really simple in their signification; and that " not — 3," though presented as a simple proposition, is really composite. Even aside from this indiscriminate commingling of the simple and the composite, this presentation seems to me to be deficient as a statement of what contradiction entails.

Contrariety would seem to be the relation among the three propositions lying at the corners of the small triangle. Dr. Jacoby states: " The positing as true of any one of the three propositions of the basic triangle of truth possibilities, is equivalent to the joint denial of the other two possibilities." [25] If my interpretation of this passage is correct, each of these three propositions is to be thought of as the contrary of each of the other two, for each is so related to each of the others that the truth of one excludes the truth of the other, yet the falsity of one does not necessitate the truth of the other. This relationship is brought out in the three " Conjunctions " taken together, though it does not come to light in the consideration of any one of them alone. These " Conjunctions " are:

[25] P. Jacoby, *art. cit.*, p. 46.

$$1 \equiv \text{not} - 2 \text{ and not} - 3$$
$$2 \equiv \text{not} - 3 \text{ and not} - 1$$
$$3 \equiv \text{not} - 1 \text{ and not} - 2$$

From the first of these it is apparent that the truth of "1" excludes the truth of "2" and the truth of "3." The third shows that "1" and "2" may both be false. Thus by conjoining these two "Conjunctions" one can become aware that "1" and "2" are mutually exclusive and that they do not exclude a middle, that is, that they cannot both be true but that they can both be false. In like manner, the second "Conjunction" indicates that "1" and "3" may both be false. Hence "1" and "3" are also mutually exclusive but not exclusive of a middle; they may be said to be contraries, just as "1" and "2" are contraries. The same is true of "2" and "3." There does not seem to be anything radically wrong with this presentation. It does suffer, however, from its mingling of simple and composite propositions. It also suffers from lack of lucidity in that one must consider two "Conjunctions" together in order to grasp the whole nature of contrariety.

Although Dr. Jacoby forswears subcontrariety and subalternation, these two relationships are revealed in his figure (e) and the accompanying "Disjunctions" and "Conjunctions" no less distinctly than are contrariety and contradiction. Subcontrariety is brought to light by a consideration of the three "Conjunctions" together. The first of these is explained in this manner: "The truth of the proposition 'every man is intelligent' implies the simultaneous truth of the propositions 'some man (at least) is intelligent' and 'either every man is intelligent or no man is intelligent.'" [26] The third is explained thus: "The truth of the composite proposition 'some men are just and some men are not just' entails (and is equivalent to) the simultaneous truth of the respective contradictories

[26] *Art. cit.*, p. 47.

of the E and A contraries, viz., 'some men are just' and 'not every man is just.'" [27] By analogy I assume that the second "Conjunction" should be interpreted as follows: "The truth of the proposition 'no man is intelligent (or just)' entails the truth of the propositions 'not every man is intelligent (or just)' and 'either every man is intelligent (or just) or no man is intelligent (or just).'" The third "Conjunction" indicates that the two propositions "some men are intelligent" and "not every man is intelligent" are not mutually exclusive. An examination of the three "Conjunctions" together makes it evident that they do exclude a middle; for one or the other of them occurs in each of the "Conjunctions," which *ex hypothesi* exhaust the possibilities. Thus these two propositions are shown to be related as subcontraries, excluding a middle, but not excluding each other. It makes no difference whether they are interpreted as simple propositions, as I contend they should be, or as composite propositions, according to Dr. Jacoby's doctrine; in either case they are subcontraries according to the showing of the Triangle of Opposites.

At least one aspect of subalternation is also indicated by the "Conjunctions." The first of these states that "All men are intelligent" implies both "Some men are intelligent" and "Either all men are intelligent or no men are intelligent." Now, if it implies both of these propositions, *a fortiori* it implies the first, "Some men are intelligent." But it is evident from the second "Disjunction" that "Some men are intelligent" does not imply "All men are intelligent." It merely implies the proposition "Either some men are intelligent and some men are not intelligent or all men are intelligent." This is the first aspect of subalternation, which is a relationship such that the truth of the first proposition implies the truth of the second but not vice versa. The second aspect of subalternation, which is the relationship such that the falsity of the first

[27] *Ibid.*

proposition implies the falsity of the second but not vice versa, is not indicated in the Triangle, so far as I can determine.

I have now to show how the Square of Opposition illustrates these relationships more simply and unmistakably than the Triangle. The Square contains the four propositions E, A, I, and O at its four corners, each of these being a simple proposition. I have already tried to vindicate the simplicity of the I and O propositions. It is supposed that this scheme is applicable to any four propositions having the same subject and predicate, but differing in quality or quantity; it is therefore impossible to state the truth of any of them categorically. *A fortiori* it is impossible to enunciate any conjunctive proposition made up of any two of them as necessarily true. There are, however, certain conjunctives combining pairs of these propositions that are possibly true; and there are others that are necessarily false. The propositions that are possibly true, or sometimes true and sometimes false, are "Both I and O" and its equivalent, "Neither E nor A."[28] The necessarily false propositions are:

Both A and O
Neither O nor A
Both E and I
Neither I nor E
Both A and E
Neither O nor I

It follows then that the contradictories of these propositions are necessarily true. These are:

Not both A and O
Either O or A

[28] It might be suggested that "Both A and I" and "Both E and O" should be included among the conjunctive propositions that are possibly true. It should be noted, however, that these are only grammatically compound sentences, not composite propositions. "Both all S is P and some S is P" states no more than "All S is P" states; and "No S is P and not all S is P" is equivalent to "No S is P."

$$\left\{\begin{array}{l}\text{Not both E and I}\\ \text{Either I or E}\end{array}\right.$$

$$\left\{\begin{array}{l}\text{Not both A and E}\\ \text{Either O or I}\end{array}\right.$$

These six propositions constitute three pairs of equivalent propositions. Nonetheless, it seems convenient for purposes of exposition to set forth both members of each pair explicitly. It will be observed that the components of each of the first two pairs are identical, while those of the third pair differ. The reason is that the components of the first two pairs are contradictories, and therefore not only mutually exclusive or exclusive of a middle, but possessing both these properties. The members of the first of the third pair of composite propositions are contraries; they are mutually exclusive but not exclusive of a middle. The members of the second of the third pair are subcontraries; they exclude a middle, but do not exclude each other.

To express contrariety, then, we need only the disjunctive proposition "Not both A and E," or "Not both all S is P and no S is P." To express subcontrariety, we need only the alternative proposition "Either O or I" or "Either not all S is P or some S is P." To express contradiction, on the other hand, neither a disjunctive nor an alternative proposition suffices. It does not reveal the whole nature of relationship between A and O to say merely, "Not both A and O"; no more does it reveal this to say merely, "Either A or O." To express the specific relationship between these two propositions it is absolutely necessary to say, "Not both A and O *and* either O or A" or "Not both all S is P and not all S is P *and* either not all S is P or all S is P." Similarly, the relationship between E and I can only be adequately expressed by saying, "Not both no S is P and some S is P and either no S is P or some S is P."

The twofold aspect of subalternation is expressed by propositions derived either from the formula for contrariety or from

the formula for subcontrariety. Since these two are equivalent, it does not matter which is used. The first aspect of subalternation, called implication, is expressed thus:

If A, then I (or) If all S is P, then some S is P.
If E, then O (or) If no S is P, then not all S is P.

The second, which can well be called subimplication, is expressed by the propositions:

If not I, then not A (or) If "Some S is P" is false, then "All S is P" is false.

If not O, then not E (or) If "Not all S is P" is false, then "No S is P" is false.

Implication is the relationship such that the truth of any proposition entails the truth of a second, but not vice versa. Subimplication is the relationship such that the falsity of the first proposition entails the falsity of the second, but not vice versa.

There are therefore eight propositions setting forth these five fundamental relationships among propositions:

Not both A and E	(Contrariety)
If A, then I If E, then O	(Implication)
If not I, then not A If not O, then not E	(Subimplication)
Either O or I	(Subcontrariety)
Not both A and O and either O or A Not both E and I and either E or E	(Contradiction)[29]

This analysis seems to demonstrate five necessary relationships obtaining between pairs of propositions. Dr. Jacoby does

[29] The following formulas could also be used to indicate contradiction:
If "A" is true, then "O" is false, and if "A" is false, then "O" is true.
If "E" is true, then "I" is false, and if "E" is false, then "I" is true.
Likewise, their contrapositives could be used. Nevertheless, it seems best to keep the number of formulations at a minimum.

not believe that subcontrariety, implication, and subimplication should be called opposition and in support of his position he quotes Aristotle's declaration that " the particular affirmative is only verbally opposed to the particular negative." [30] Whether subcontraries and subalterns should be denominated opposites must, of course, depend upon the definition attached to the term " opposite." If it means " propositions that cannot both be true," then clearly it denotes only contraries and contradictories. But even this definition would not completely conform to the ordinary signification of the word, namely, "situated in front of or over against." This meaning would seem to require that the word should be confined to designating those propositions that *always* stand over against each other as regards truth and falsity. In that case, only contradictories should be called opposites, for contraries can be alike in their falsity. Since this strictest meaning is not to be adhered to, I see no reason why the term cannot be understood to mean " propositions that can differ as regards their truth and falsity." In this sense it would denote subcontraries and subalterns as well as contradictories and contraries. The term would also apply to all these kinds of relationships if it were taken to mean " propositions situated over against each other on the Square of Opposition."

This usage is undoubtedly opposed to the doctrine of Aristotle as quoted by Dr. Jacoby. But, to avail myself of the Philosopher's own expression, I contend that the opposition is verbal rather than real. For, whether subcontrariety and subalternation are called opposition or not, these relationships are just as necessary as contradiction and contrariety. They are implicit in Aristotle's own statements, and they come to light in Dr. Jacoby's own analysis no less forcibly, though I believe less clearly, than in my own. It does not seem to me to be non-aristotelian to make these relationships explicit and to provide a place for them in a diagram. Rather it seems to be altogether

[30] P. Jacoby, *art. cit.*, p. 42.

in the spirit of the Stagirite to bring to light all the truth that may lie hidden in his writings as well as those aspects of nature that were hidden from him.

The beauty of the Square of Opposition lies in the symmetry of structure whereby it reveals these five necessary relationships. Dr. Jacoby claims this quality for his Triangle;[31] but his figure notably lacks symmetry. He speaks of a "principle of contrariety," but there does not seem to be any reason for invoking such a principle; the principle of contradiction affords sufficient ground for asserting that contrary propositions cannot both be true. "All S is P" and "No S is P" cannot both be true because the one attributes to the subject that which the other denies regarding it, in violation of the principle of contradiction. No additional "principle of contrariety" is required to confound anyone that would seek to conjoin them. The real difference between contradiction and contrariety lies in this that, whereas the principle of contradiction is applicable to both of them, the principle of the excluded middle has reference only to contradiction. Contrary propositions as well as contradictory propositions are mutually exclusive; contradictory propositions, unlike contrary propositions, are exclusive of any middle. But there are other propositions to which the principle of the excluded middle also applies. Subcontrary propositions, like contradictories, exclude a middle, for they cannot both be false; unlike contraries and contradictories, they are not mutually exclusive. This characteristic of subcontraries is indicated in the Triangle and its accompanying "Conjunctions," which show that in every possible instance either "Some S is P" or "Not all S is P" is true and that in one instance both are true. This statement does not touch upon the disagreement as to whether these propositions are simple or composite; the relationship is the same in either case. The Triangle, however, fails to provide any graphic representation of this relationship, and thus fails in symmetry.

[31] *Art. cit.*, p. 48.

It provides for contrariety, characterized by mutual exclusivity only, and for contradiction, characterized by mutual exclusivity *and* the exclusion of a middle; but it makes no place for subcontrariety, which is characterized by exclusion of a middle only. There is thus a yawning gap in its scheme of things, destroying its beauty.

The Square of Opposition, on the other hand, provides a graphic representation of these kinds of relationship, as it does for subalternation also. That there is a resemblance between contrariety and subcontrariety is signified by the parallel positions of the two lines that represent them; that there is a difference between them is symbolized by their lying the one at the top of the Square, the other at the bottom. That the two principles of contradiction and of the excluded middle, which singly apply to contrariety and subcontrariety, are both involved in contradiction is shown by the positions of contradictory propositions at diametrically opposite corners, thus separated not by a single line, as are contraries and subcontraries, but by two lines. It also appears to be fitting that the two aspects of subalternation should be designated by the vertical line, the movement downward standing for implication, the movement upward, subimplication.

A final word ought to be said regarding the formulas used to express the five relationships. I have declared that contradiction can be adequately expressed only by a conjunctive proposition setting forth that the components are both mutually exclusive and exclusive of a middle. Some of the writers of text books appear to believe that contradiction is properly enunciated by a proposition in the form, " Either P or Q." It should be evident that this formulation takes account of only one phase of contradiction, namely, the exclusion of a middle, the complete statement of the possibilities. It neglects the other phase of this relationship, the mutual exclusivity of contradictories. The form, " Either P or Q " is equally applicable to components related as subcontraries. Recognizing this fact, yet apparently

loath to admit subcontrariety to the select circle, these writers speak of two kinds of propositions in the form, "Either P or Q," calling those whose components are contradictories "perfect" disjunctive propositions and those whose components are subcontraries "imperfect";[32] or those with contradictories for their components, "properly disjunctive" and those with subcontraries for their components, "improperly disjunctive."[33] It hardly seems to me to be proper to shunt subcontrariety off like this, in the manner of a poor relation allowed to eat only at the second table. For not only between the I and O propositions of the Square, which are formally subcontraries, does this form of opposition obtain, but between countless pairs of propositions encountered in everyday thinking. A few examples of propositions, called by these authors disjunctive, but I believe better denominated alternative, made up of components that exclude a middle but do not exclude each other are:

Either the sun or the earth moves.
Either a person is a citizen or he may not vote.
Either a person is not a citizen of Indiana or he is a citizen of the United States.
Either a person believes in the Trinity or he is not a Catholic.
Either this person takes too long a time to do this job or that person takes too short a time.
Either a person does not take bribes or he is not honest.

Assuredly there are other pairs of propositions, besides the A and O and the E and I propositions of the Square of Opposition, which not only exclude a middle but also exclude each other. These may well be called material contradictories. When a formula is required that will show how such pairs of propositions are related, I think that it ought to be required that the formula should express both phases of the relationship.

[32] R. McCall, *Basic Logic* (New York, 1947), p. 65.
[33] J. Maritain, *An Introduction to Logic* (New York, 1937), p. 103.

One of the purposes of the study of logic is to provide means of escaping from the dangers to effective thinking that lurk in the ambiguity of language. A nomenclature that allows for two kinds of "disjunctive" proposition, and yet furnishes no criterion for distinguishing between them seems to me rather to foster than to discourage slovenly thinking. The function of language is to express one's thoughts for the purpose of communicating them to others or of clarifying them for oneself.[34] For both these purposes it is essential that the import of terms and propositions be as precise and unmistakable as it is capable of becoming. Every locution ought to express *all* that the speaker or writer has in mind and *no more* than he has in mind. But when the formula, "Either P or Q," is permitted to be used indiscriminately to symbolize both subcontrariety and contradiction there is danger that in the one case it will be interpreted to mean more than is intended and in the other case it will be taken to mean less than is intended. The double relationship actually obtains between the components of the following propositions and for that reason I believe that it ought to be required to be fully expressed in the manner I here use, corresponding to the formulation of contradiction on the Square of Opposition:

> Every substance is either simple or compound and no substance is both simple and compound.
>
> Every proposition is either simple or composite and no proposition is both simple and composite.
>
> The violent man harms himself or harms no one and he does not harm himself and no one.[35]

[34] I would call attention to the fact that this sentence is intended to be understood to mean just what it says and no more. The two purposes are not mutually exclusive, since one may at the same time wish to let another know what he thinks and to clarify his own thoughts by giving voice to them. This sentence, then, provides another example of the occurrence of subcontrariety in everyday thought.

[35] The proposition, "The violent man harms himself or harms no one,"

Every proposition is either true or false and no proposition is both true and false.

There is a parallel between the question here at issue and the disagreement in which I am involved with Dr. Jacoby regarding the proper interpretation of I and O proposition. Those that contend that the locution, "Either P or Q," should be reserved for symbolizing contradiction might be expected also to maintain that any one wishing to show that a pair of propositions are subcontraries ought to be required to say, "Either P or Q and perhaps both P and Q." This thesis would commit the same error that Dr. Jacoby is guilty of in making out that "Some S is P and possibly all S is P" is a composite proposition; for the enlarged locution really says no more than does the alternative proposition, "Either P or Q," alone gives expression to. Just as it is possible to secure sufficient information to be able to utter a particular proposition without knowing whether its subcontrary or its superimplicant is true, so also is it possible to learn that two propositions exclude a middle before one becomes aware they are mutually exclusive or not mutually exclusive, as the case may be. In a given case, the added item of information to the effect that the propositions in question are also mutually exclusive ought therefore to be expressed by the addition of the disjunctive, "Not both P and Q," to the alternative already enunciated. That two propositions are exclusive of a middle can be earlier learned than that they are *both* exclusive of a middle and mutually exclusive. Hence not the formula for subcontrariety but the formula for contradiction ought to be a conjunction of two composite propositions.

I should like to illustrate my point by a homely autobiograpical example. In my youth, I was informed by my grandfather that all the members of his family except himself were either

is cited by Maritain as an instance of the "improperly disjunctive proposition" (*op. cit.*, p. 104). It is evident, however, that anyone that harms himself harms someone.

red-headed or left-handed. I do not recollect whether he said that any of them possessed both these characteristics, but I am certain of this bit of information about my granduncles and grandaunts, none of whom I ever saw. Perhaps none of them was both red-headed and left-handed. If so, then, in addition to the proposition, "All were either red-headed or left-handed," the proposition, "None was both red-headed and left-handed," is true. On the other hand, if some did enjoy both these features, then the proposition, "Some were both red-headed and left-handed," is true. Should I come to know which of these two propositions is true I should be able to enunciate a conjunctive proposition, expressing more than that which I am now able to state with confidence. Surely the proposition that carries the greater information should be denominated the conjunctive, rather than the one that carries the less.

I believe, therefore, that the formula, "Either P or Q," should be restricted to use in symbolizing subcontrariety, that is, cases where the speaker either does not know or does not care [36] whether P and Q are mutually exclusive; and that, where the propositions in question are really contradictory and the speaker's argument demands that this fact be made explicit, he should be required to make the complete statement, "Either P or Q and not both P and Q." We should have an end, then, to the enigmatic, "Either P or Q," which may be a "perfect" disjunctive or an "imperfect" disjunctive, with no Oedipus to tell us which.

I do not know whether the Triangle of Opposites and the Square of Opposition represent theses that are contrary or contradictory or subcontrary to each other. I hope that it may be shown that they are subcontraries and that Dr. Jacoby and I are both right.

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[36] Another instance of subcontrariety. One could both not know and not care, without affecting the force of my agrument.

Toward a Physical Theory

by Raymond J. Nogar, O.P.

I

Like all the other natural sciences, Physics advances by two distinct roads. On the one hand it operates empirically, and thus is enabled to discover and analyse a growing number of phenomena—in this instance, of physical facts; on the other hand it also operates by theory, which allows it to collect and assemble the known facts in one consistent system, and to predict new ones for the guidance of experimental research. In this way the joint efforts of experiment and theory, at any given time, provide the body of knowledge which is the sum total of the Physics of the day.[1]

WHETHER THE SERIOUS student of physical science begins his study with the Greeks or with Galileo, he finds the joint efforts of investigation of physical phenomena and explanatory theory at the very heart of science on every page of its brilliant history. Scientific investigation of nature is necessarily both investigative and systematic, and therefore these two functions of physical science are never wanting. Where physical science is found in perfect form, empirical investigation and systematic theory are so welded into a single edifice that they are no longer seen as merely integral parts but essential to the very definition of physical science.

During that momentous age in the history of science when great impetus was given to experiment and observational technique, both in the field of investigation and mathematical application, when the founders of modern science were re-examining nature with new hypotheses, attention was temporarily diverted from the field of physical theory. In fact, it was in reaction

[1] Louis de Broglie, *Matter and Light* (New York, 1939), p. 18.

to an over-emphasis upon general theory that Galileo struck off on a new path and founded his two new sciences of motion. His principle of inertia and his whole superstructure of investigative technique immediately initiated the demand for a systematic theory by which the body of mechanical knowledge could be assembled into a consistent system and made intelligible in the light of the other branches of science. Newton's *Principia* was calculated to perfect the work which Galileo began and its chief concern was to provide a systematic treatment of the principles of mechanics which would organize the science and place it on a theoretic foundation which would support the edifice about to be erected. Although the founders of modern science emphasized the new dynamic investigative techniques, a closer look at their thought shows that they were equally concerned with the validity, the clarity, the consistency and the precision of their theories. The doctrine of inertia, the foundation stone of modern dynamics upon which the whole structure of classical physics rests, has itself called forth a continual body of critical writing from the first day of its publication. Questions as to whether the law is false or self-evident; established *a priori* or empirically; or is merely a convention, make up that part of theory which is essentially united to the investigation of nature based on it.[2]

Every branch of modern science has this twofold development of which de Broglie speaks, a development which is sometimes the work of a single genius in both avenues, but more often the experimental and investigative contributions are made by one group of scientists and the theoretical contributions by another. Thus A. d'Abro summarizes this development:

> The development of all the branches of physical science has proceeded roughly along the same lines. First we witness an accumulation of experimental and observational facts, furnished by crude observation

[2] G. Whitrow, "On the Foundation of Dynamics," *The British Journal for the Philosophy of Science*, I (1950), 2.

and by the discoveries of the laboratory workers. Then, thanks to the efforts of the theoretical investigators, this raw material is co-ordinated into a consistent whole. In this way, out of a disconnected series of facts, a coherent doctrine or science is born. History proves that with very few exceptions (illustrated by such men as Newton, Archimedes and also Hertz), the most brilliant experimenters had but little theorising ability; and that, vice versa, the ablest theoretical scientists made poor laboratory men. We are thus led to differentiate between two distinct types of scientists: the practical and the theoretical workers. For example, in physics, Maxwell, Planck and Einstein must be placed under the heading of theoretical investigators, whereas Hertz and Michelson are splendid illustrations of able experimenters.[3]

Any doubts as to the importance of scientific theory in the building and buttressing of modern science and its essential unity with the investigation of phenomena are immediately dissipated by even a cursory survey of the enormous body of theoretical writing on every level of scientific endeavor. Scientific hypothesis and theory govern the very use of observational data, and elaborate rules for setting up experimental theory manifest the importance of the theory in handling the data of science.[4] On the level of specialized areas of every branch of physical science, restricted theories play a most important role of systematizing the data. Examples of theory on this level are Gauss's theory of the heavenly bodies moving about the sun in conic sections, which helped to elaborate the orbit theory in one department of astronomy; the Bohr theory of the atom in nuclear physics; Dumas' theory of types in inorganic chemistry; Driesch's theory of entelechy in biology.

On yet a larger scale, there are systems or theories which organize entire branches of science, theories which extend to most of the data of the science and in the light of which all

[3] A. d'Abro, *The Evolution of Scientific Thought* (New York, 1949), pp. 343-344.

[4] Cf. the "Genealogy of a Scientific Theory," in H. Lemon's *From Galileo to Cosmic Rays* (Chicago, 1936), p. 152. Cf. also, F. S. C. Northrop *The Logic of the Sciences and the Humanities* (New York, 1947), p. 145.

the data are unified and rendered intelligible. Of this sort is the kinetic molecular theory of gases so important in systematizing general chemistry. The classical theory of mechanics established by Newton according to which his law is elaborated is applied to the whole of dynamics in the field of mechanics, heat and light phenomena. The electromagnetic theory of light contributes to systematic handling of neutral phenomena, scalar wave phenomena, vectorial wave phenomena and electromagnetic phenomena, and this theory, together with the theories of Fresnel and Einstein are examples of theories which organize whole sections of physical data. The Schwann and Schleiden cell-theory founded a whole new section of scientific cytology; De Vries theory of mutation likewise organized in large part many experimental problems relating to evolutionary theory.

On a wider scale and with much more far-reaching implications stand the theory of relativity, the quantum theory, the classical wave theory in optics, the atomic theory and the theory of evolution, for all of these theories are calculated to cut across whole sections of science in an attempt to integrate scientific conclusions in the the simplest possible theoretical system.

Besides theoretical organization of data on these levels, theories which operate very close to the experimental technique, there are the theories of cosmogony and cosmology which attempt to synthesize all the data of the universe and apply the important general theories to the problem of the architecture of the universe itself. The theoretical writings of Eddington, Jeans, and Milne on cosmological structure and evolution are examples of this type of theory.

And finally, there are theoretical writers who have formulated systems which attempt to unify the conclusions of science on logical, grammatical, or historical grounds in contradistinction to systems of a mathematical-physical or metaphysical nature. Among these must be mentioned the application of the theory of logical positivism, existentialism, and the Marxian

theory of history to the several branches of science to the end of giving unity and meaning to the vast details of scientific data.

From this body of theoretical writing essentially united to our rapidly growing empirical knowledge, we are able not only to conclude to the necessity of a comprehensive and coherent theory of physical science—but also we are able to see the essential role that theory must play in the development of physical science.

Just as the empirical knowledge, the investigation of phenomena, so the general theory integrating this knowledge, is concerned from beginning to end with the real world. This is not to say that measurement and construct and hypothesis and mathematical transformation and symbolization are not tools of physical science, tools which often only indirectly contact physical reality. But mathematical transformation always remains a tool, a means to the end of investigating physical phenomena.[5] However remote the physical realities become in the constructural hypothesis, a denotative reference to the originally given implicitly remains and must, sooner or later, be the test of the validity of the hypothesis. In the words of Hermann Weyl:

> In modern physics the building material is no longer the elements of consciousness abstracted from reality, but purely 'arithmetical' symbols. Dingler in fact defines physics as that scientific domain in which the principle of symbolic construction is carried through completely. But, coupled with aprioristic construction, we have experience and the analysis of experience by the experiment. "The scientific imagination was regulated by the strict methods which subjected the possibilities that lay in mathematical thinking to experience, experiment and confirmation by facts . . . (W. Dilthey, "Der entwicklungsgeschichtliche Pantheismus," *Gesammelte Schriften*, II, 346).[6]

[5] "Mathematics, for the theoretical physicists, constitutes but a tool, a means of arriving at a co-ordination of the physical facts." A. d'Abro, *op. cit.*, p. 344.

[6] H. Weyl, *Philosophy of Mathematics and Natural Science* (Princeton, 1949), p. 151.

Physical theories, therefore, must first play this role of systematically organizing the entire data of knowledge from the real world and the first principles of the science down to the most detailed empirical conclusions. It must form a picture of reality, as Einstein says, and show the connection of its myriad of constructs with the world of our sense impressions.[7] And the theoretical system which ultimately is preferred over all other imaginable constructions is the one which the world of perception unambiguously determines superior to all others.[8]

But the role of establishing contact with the world of reality is but the first general duty of physical theory. Of equal importance is its role of integrating the knowledge of every branch of science into a consistent and coherent system. This includes, of course, the formidable task of unifying not only the branches of physics, but also the sciences of chemistry and the manifold branches of the biological sciences, astronomy, and general cosmology. Not every theoretician of science finds this role agreeable, and some writers like Prof. Dingle prefer to preclude chemistry and the biological problems from the scientific domain because of the inherent difficulty of subjecting their terminology and methodology to the quantified theory of physics.[9] Indeed, chemistry has recently taken great strides in welding its huge body of facts into a unified system mainly by the application of developments in atomic physics, but the problems of the transformation of matter and the study of properties and structure of matter still call for qualitative terminology which does not readily give itself over to mathematical transformation. Much more is this true of the biological sciences, in spite of the bril-

[7] "Science is not just a collection of laws, a catalogue of unrelated facts. It is a creation of the human mind, with its freely invented ideas and concepts. Physical theories try to form a picture of reality and to establish its connection with the wide world of sense impressions." A. Einstein and L. Infeld, *The Evolution of Physics* (New York, 1938), p. 310.

[8] H. Weyl, *op. cit.* (quoting Einstein's address), p. 153.

[9] Cf. H. Dingle, "The Nature of Scientific Philosophy," *Proc. of the Royal Soc. of Edinburgh* (1949), 62, IV, 409.

liant attempts of men like D'Arcy W. Thompson, Erwin Schrodinger, and Ludwig Von Bertalanffy to subject biological data to the laws and theories of mathematical physics.[10] Biology remains essentially a qualitative science, and physical theory must embrace this science too if it is to integrate the whole body of empirical knowledge into a single coherent system.

And yet the role of physical theory takes on another function which adds to the dilemma of diversity of subject matter and method in modern science. The theory must be not only sufficiently broad and flexible to include every branch of science, and sufficiently in touch with the physical givenness of things to be ever denotative of physical reality, it must be of such a nature to allow for the precision and exactitude necessary for the positive promotion of a full development of special theory and method within the several branches of modern science. Modern theory must preserve and enhance the splendid superstructure of particular theoretical development in mechanics and optics and thermodynamics and particle physics. This means that our general theory which places us in contact with reality and qualitative experience, and unifies and coordinates the several branches of diverse sciences, must not detract an iota from the precision by which the most developed disciplines of physical science have earned the title of being "exact."

Now it is this last point which has given rise to an ever increasing amount of mathematical theory on every level of scientific endeavor. It is a truism in the tradition of mechanics that the first principle of scientific investigation is, in the canonized words of Galileo, "to measure what is measurable and to try to render measurable what is not so as yet" on the supposition that to obtain exact knowledge of nature the scientist must read the mathematical language in which the truths

[10] Cf. D'Arcy W. Thompson, *Growth and Form* (New York, 1948), E. Schrodinger, *What is Life?* (New York, 1946), L. Von Bertalanffy, "An Outline of General Theory," *The British Journal for the Philosophy of Science*, I, 2, 134 ff.

of nature are written.[11] "In modern science," says d'Abro, "at least in physical science these works of co-ordination (between experimentation and theory) can be attempted only through the medium of advanced mathematical analysis." [12] And the business of relating the immediate scientific conclusions to a general world view is the business, not of the scientist, but the philosopher. In this way alone, it seems to some, can the precision and exactitude of science be protected from the incursions of qualitative and therefore inexact statements about their scientific conclusions. This restricted definition of the exact as a property of scientific investigation and theory in terms of quantity and measurement of quantity was a contribution of classical mechanics, in which the only scientific statement about physical reality was the mechanical model, the closest thing to an analogy between the language of quantity and the natural world the theoretical writers could find. Refinement of this quantified modeling came at the turn of this century when it was recognized that mechanical models were but structural fictions, entirely uncalled for in a mathematical theory of physics. So the mathematical model was substituted for the mechanical one. The remarkable work of Weyl, *Theory of Groups and Quantum Mechanics*, is an example of this type of emancipated, highly developed mathematical theory, where the exactitude of the science has the precision and certitude of mathematical deduction purified of any qualitative implications. But the theory of mathematical physics, laying claim to refined exactitude, lost claim to any development along the lines of manifesting the physical relevance of the theory. This shortcoming was so manifest that an attempt has been made to buttress the writings of mathematical theory with physical principles. In the process of setting up synthetic generalizations, Heisenberg remarks:

[11] H. Weyl, *op. cit.*, p. 139.
[12] A. d'Abro, *op. cit.*, p. 344.

> . . . the solid ground of experimental proof has often been forsaken, and generalizations have been accepted uncritically, until finally contradictions between theory and experiment have become apparent. In order to avoid these contradictions, it seems necessary to demand that no concept enter a theory which has not been experimentally verified at least to the same degree of accuracy as the experiments to be explained by the theory.[13]

The quantum theory itself, though mathematical in its formulation and application, boasts this advantage over former mathematical and mechanical theories that it is able to give a more faithful reproduction of the qualitative givenness of sensory experience than any theory that preceded it.[14]

However successful mathematical theory has been in providing exact measurements and precision in deductive argumentation as a specialized tool for certain branches of physical science, it has been relatively incompetent in embracing the entire area of scientific thought and integrating the biological and cosmological sciences. Its most serious defect is that mathematical theory fails to account for the physical side of physical science. For this reason, Eddington, commenting on the relativity theory, states plainly that mathematics is not and cannot be the heart of physical theory:

> Some writings on relativity look a bit mathematical. Since I am not entirely convinced of the innocence of some of my colleagues, I must on this point answer only for myself. I declare that the suspicions are groundless. If I sometimes employ pure mathematics, it is only as a drudge; my devotion is fixed on the physical thought which lies behind the mathematics. Mathematics is a useful vehicle for expression and manipulation; but the heart of the theory is elsewhere:
>
> Euphelia serves to grace my measure
> But Chloe is my real flame.[15]

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[13] W. Heisenberg, *The Physical Principles of Quantum Theory* (New York, 1930), p. 1.

[14] P. W. Bridgman, *The Nature of Physical Theory* (New York, 1936), p. 111.

[15] A. Eddington, *The Philosophy of Physical Science* (Cambridge, 1949), p. 74.

The passion for mathematical precision and quantitative exactitude in contemporary science is constantly counterbalanced in theoretical writing by the strong disinclination to stray far from the sensory experience of which the measurement is but a kind of symbolic expression. The reason for this latter reluctance is not difficult to discover. Besides the mathematical precision which is the boast of modern exact science, the scientific mind needs the guarantee of physical certainty, certainty that what is able to be demonstrated by the abstractions of mathematical induction can also be demonstrated to be physically verifiable. The human mind is not satisfied with less than physical certitude about the sensible world about us, no matter how fascinated it might become with the rationalization of quantitative abstractions. The tendency of contemporary science to become scientifically engulfed by its abstractions and the consequent lack of true physical demonstration and proof are manifestly great shortcomings in our present theory.

There has been, of late, a marked swing of interest from the mathematical theory of specialized branches of physical science to a more general theory calculated to make up for the deficiencies just mentioned. Making a new start, Margenau points out the direction of this new tendency. Modern theory must supply an orderly, systematic passage from sense data to construct, and rules of correspondence between those data and their constructs. What is more, since the constructs are not wholly determined by perception, the whole field of the formation of constructs and their interpretation must be subject to that same orderly systematic theory.[16]

That this function of scientific theory is essential to modern science is agreed upon by Philipp Frank in his analysis of the conditions of scientific theory, and he carefully sets aside the possibility that this role can be played merely by applying

[16] H. Margenau, *The Nature of Physical Reality* (New York, 1950), pp. 54-81.

common sense to scientific conclusions. True, the original experience of the phenomena we study in science can be described in common sense terms. But those concepts must be refined and ordered in a precise way before they can be included into the body of science. Common sense retains contact with the world of the senses, yet it is too crude to satisfy the canons of science.[17]

The problems of integrating the language of common sense and that of the scientific conclusion is for Frank and the logical-positivists merely a problem of an analysis of language. By developing a scientific language, the constructs of science and the language of the breakfast table can be brought into a perfect agreement. To this end the International Encyclopedia of Unified Sciences was constructed and the Unity of Sciences congresses convened.[18] The theory of science must be for this group a metaphysical one, metaphysical in the sense of " outside " the physical science; for the theory of science, according to the logical-positivists, consists in a rigorous analysis of language.

Margenau, too, advances arguments for a systematic theory which would play the role of establishing relationship between the conclusions of science and all the other areas of knowledge. He heartily agrees that this cannot be the function of crude common sense. But he also realizes that qualitative theory which systematically orders all of scientific knowledge and integrates the sciences both within and without cannot merely rest in an analysis of scientific language.[19] In a sense the language in which science is clothed lies just as far outside the realities of science as does the mathematical measurement and the idealized experiment. The only science which can provide the principles of basic scientific theory which will fill

[17] P. Frank, " Metaphysical Interpretations of Science, *The British Journal for the Philosophy of Science*, I (1950), 2, 83-90. Cf. also his recent book: *Modern Science and its Philosophy* (Cambridge, 1950), Ch. 7.

[18] P. Frank, *op. cit.*, pp. 1-52.

[19] H. Margenau, *op. cit.*, p. 57.

the roles mentioned above is that branch of metaphysics called epistemology:

> Our conclusion will be that modern theory, far from abandoning epistemology as a guide to understanding, has reaffirmed its faith in that discipline and has decided to trust it to the last, even beyond the precepts of common sense.[20]

With this clear statement of purpose Margenau reintroduces into theoretical physics the dreaded term which was so violently extirpated from the domain of science at the time of Mach and Poincaré, a term which he himself admits is odious in some quarters. The chief objection to the intrusion of metaphysical theory remains the same as before, that it cannot give a physical account of the realities handled in physical science, but must rely upon analogies or metaphors to integrate scientific data and coordinate the quantities with qualitative experience. Sommerhoff airs his indignation at the intrusion thus:

> Many important questions still lie well beyond the scope of physical thought, and speculative philosophy has this in common with all other bodies of theoretical thought which fail to satisfy the standards of precision achieved by modern physics, that it recognises the power of language to convey, although not literal truth, at least some form of insight to suitable audiences. Thus it is prepared to discuss metaphorically and inconclusively rather than not at all the many important questions which physico-mathematical thought has so far been unable to reach. A. N. Whitehead's works are attempts to say significant things about the nature of organic order in such metaphorical terms. . . . No doubt such efforts are valuable, and their colorful phraseology contrasts strongly with the drabness of the physical language, but, however beautiful and masterly, such metaphorical systems of thought can never achieve the same conclusiveness and the same possibilities of agreement as scientific theories.[21]

This almost instinctive distrust of any qualitative statement about physical reality which does not immediately lend itself

[20] H. Margenau, *op. cit.*, pp. 307-08.
[21] G. Sommerhoff, *Analytic Biology* (London, 1950), p. 34.

to being measured quantitatively is characteristic of most of contemporary theory. The over-emphasis upon the measurable tends to persuade scientific writers that no qualitative statement can be precise and conclusive, and that any qualitative statement is an analogy or a metaphorical expression. To allow this bias would be a critical error. But the objection raised against the intrusion into physical theory of a metaphysical system, a system in which analogies and metaphors are the proper language, is one worth considering. For if the language of mathematics is not able to organize physical science because its transformation leaves out the entire physical relevance of sense data, so also the language of metaphysics cannot be the language of strictly physical statements because its transformation likewise only indirectly connotes reality as physical.

Now it would not be correct to say that metaphysics and its analogies, its penetrating proportions between the seen and the unseen, cannot supply principles which would in some way organize physical science. Nor would it be exact to say that metaphysics has nothing to do with physical realities. The mistaken view of some who attempt to characterize the metaphysical world as something behind physical reality, a world of shadowy unrealities, is criticized by M. Planck:

> As there is a material object behind every sensation, so there is a metaphysical reality behind every thing that human experience shows to be real . . . the word 'behind' must not be interpreted in an external or spatial sense. Instead of 'behind,' we could just as well say, 'in' or 'within.' Metaphysical reality does not stand spatially behind what is given in experience, but lies fully within it. 'Nature is neither core nor shell—she is everything at once.' [22]

The objection to the intrusion of metaphysics into the domain of physics cannot be, therefore, that the science which penetrates to the core of all reality is not able to speak authoritatively about physical reality. The objection must be that the lan-

[22] M. Planck, *Scientific Autobiography* (New York, 1949), pp. 101-2.

guage of metaphysics cannot be the proper and adequate language of physical reality as it is physical. Before there can be set up a science of proportions between sensible reality and the hidden reality which "lies fully within" that sensible reality, there must be a science of the strictly sensible as such. Physical scientists see the obvious dilemma in asserting that physical realities are properly organized and understood by analogies or comparisons to physical realities. There must be a science of physical realities, before there can be science of analogies to those physical realities. This means that the organizing power of metaphysics presupposes a physical theory and cannot supplant it. If you cannot know this physical world with a systematic univocal physical knowledge, analogous metaphysical knowledge which presupposes physical knowledge can bring you no closer.

And thus we are confronted with the dilemma of modern scientific theory, having shown that physical theory pertains to the essential perfection of physical science and that physical theory must play a role not only of generic and specific integration of every branch of science, but must guarantee continuous contact with physical reality from which it begins and to which it ever looks for its verification. Our dilemma is found in the fact that no existing theory proposed to fill the role outlined measures up to the part. Neither common sense nor mathematical theory nor metaphysical theory provides an adequate integration of physical sciences. Therefore we are compelled to look elsewhere.

II

Fortunately, the unknown theory for which we search shows up in our analysis like a gap in the periodic table of Mendeleyev; we know from the way which this theory must stand in relation to our mathematical, common sense and metaphysical theories that the unknown quantity must be a purely physical theory, differing *toto caelo* from each of the current theories, yet bearing

a very close affinity to them. That there must be a purely physical theory seems evident from our present analysis, for such a theory is necessary to the essential perfection of physical science. We have already described in detail the very difficult role our theory must play. The properties of a purely physical theory we must now proceed to investigate. Having ascertained the properties of a purely physical theory, it will be possible to examine existing physical theory to see if we can actually identify those properties.

If we are to have a perfectly integrated physical science, a univocal physical theory, distinct from common sense, from a mathematical or mathematico-physical theory, and from metaphysical theory, is absolutely necessary. For only a univocal theory of the physical universe as it is physical can (a) provide denotative reference on a scientific level to the sensible world, remaining ever in contact with that sensible reality; (b) scientifically integrate the conclusions of every branch of physical science into a comprehensive and coherent physical system; and yet in all this, (c) scientifically provide precise and exact physical principles which will in turn promote the full development of special theory and method within the several branches of science.

From the role such a univocal physical theory must play, we can deduce some of its important properties. Taking the functions of physical theory one by one, the following properties must be expected. First, because physical theory must be scientifically denotative of sensible reality from beginning to end, it follows that it must not be either mathematical or metaphysical in its definitions, principles, and conclusions. The whole elaboration of general physical theory must be exclusively physical to retain that denotative character. The physical world, then, will be viewed primarily as a natural object, and the artificial techniques of scientific investigation will be evaluated in terms of the natural and their ultimate meaning will be found

in natural terms. Following as a corollary, this physical theory will be essentially qualitative and reductively sensible, that is, ultimately reduced to the primary sources of physical knowledge, the senses. It follows from these two characteristics that univocal physical theory will be readily integrated with both common sense and the rational disciplines on other than the purely physical level. But at this point, a serious objection must be forestalled. Let it be noted that the essential qualitative or denotative property of physical theory must be present not in a gross sense or a metaphorical sense, but in a precise and exact univocal way. Precision and exactitude in a strict scientific sense must be expected, but not the exactitude of the mathematical sciences which are purer because of their abstraction from sensible notes. We must expect precise, logical, exact handling of physical theory, but with the precision, logic and exactitude proper to sensible things alone.

The concept of physical science must retain both the notion of the scientific and the physical. Though much has been wanting in present-day writing in the development of the notion of certainty, we are confronted with the problem of scientific certainty in physical science. Science which does not have its yield of certain conclusions does not satisfy the true notion of science. Science is more than exact measurement and precise mathematical deduction. Certainty must extend scientifically to the physical conclusions concerning the world about us. The conclusions of physical science must be endowed with the property of physical certitude, a property quite distinct from accurate measurement. But physical certitude is not mathematical certitude, and to complain that the former lacks the luster and clarity of the latter is a manifest sign of gross misunderstanding of the limited powers of the human intellect. In order for physical science to be truly physical and truly scientific, however, it must cultivate a body of conclusions endowed with the prerogative of physical certainty.

Secondly, since univocal physical theory must scientifically integrate each branch of physical science and systematically order them among themselves, other properties must be present. This theory will have the potentiality of giving full recognition to the diverse branches of physical science, dividing them according to their special problems and treating them singly as specifically distinct branches. The need for preserving and respecting the diversity of methods and problems among the several branches is noted by Weyl, when he writes of the ways in which organic matter can be approached by the physicist and the biologist.[23] But within each branch of physical science, the elaboration of conclusions, laws, hypotheses and special theories must be organized in terms of the general physical theory; thus the experimental data and mathematical transformation, for instance, insofar as they have a term in physical knowledge, will be organized and made intelligible by the general physical theory. In resolving the physical conclusions of each branch, the general theory will, in turn, integrate the several branches among themselves into a comprehensive, consistent, physical system, linking the conclusions in a scientific way among themselves, and resolving them in terms of the sensible universe about which they were originally calculated to speak.

The third role of physical theory provides further dynamic properties. If physical theory seems on the face of things to allow for a kind of eclectic concordance of a general world view and particular scientific facts, this role excludes such eclecticism. There must be inherent in the physical theory itself the scientific provision of principles which make possible the full development of each branch of physical science according to the investigative procedures proper to it. This is not the place, perhaps, to show the utter inability of eclecticism in any form to provide a dynamic physical theory of science. To approach, for example, the problem of integration of the sciences by treat-

[23] H. Weyl, *Philosophy of Mathematics and Natural Science*, p. 283.

ing it as an historically dialectical and evolutionary process, or as a linguistic problem of mere terminology and syntax, is to view the problem in a static way. The solution ever remains extrinsic to the real problem. The physical principles elaborated by a univocal scientific theory must themselves not only allow for but provide adequate handling of investigative technique and specific methodology in keeping with the general theory. General theory must constantly contribute, and actively so, to the perfection of special theory and investigation. Consequently, this theory must guide and promote and regulate, within its general means, the formulation of new hypothetical procedure, the elaboration of new laws, the use of mathematics, the promotion of useful constructs and the application of useful experimental technique. Theory is one with investigation in physical science, and physical theory must make a positive and orderly contribution to investigation of nature. This is possible by reason of the fact that it is the business of this theory to know how the quantitative reduces to the qualitative, the construct and the experiment to natural phenomena, the mathematical-physical to the sensible, the hypothetical and probable to the physically demonstrable, the particular details to the general, the measurable to experience. Physical theory does not merely sit as a judge of investigative science; theory designs and dynamically executes the progressive development of scientific research.

This manifestly incomplete account of the properties of a purely physical theory must suffice for our purpose of opening an investigation of existing physical theory for a solution of the dilemma outlined above. Can we find, among existing theoretical writings, a systematic univocal physical theory with properties closely approximating those just deduced from the necessary role of physical theory?

It should not come as a great shock and surprise, upon examining the status of such a theory among current writings, to learn

that there is lacking, almost altogether, any trace of a purely physical system. There are sporadic writings in isolated branches of science developing the possibilities of a strictly physical theory and these appear most often in the field of biology.[24] But for modern science since the 1700's, physical theory has come to mean mathematical theory applied to physical reality. In the words of Pierre Duhem, great physicist and historian of physics:

> The theory of physics is not an explanation; it is a system of mathematical propositions deduced from a small number of principles the aim of which is to represent as simply, as completely, and as exactly as possible, a group of experimental laws.[25]

The only comprehensive, strictly physical science fully developed into a system embracing the entire field of physical knowledge was the Aristotelian physical science, the traces of which are negligible in modern scientific theory. Contact with the Aristotelian cosmological system comes to us by way of writers quite unknown in scientific circles, with the exception of a handful of modern workers in scientific fields. Among these must be listed Hans Driesch in Germany, Remy Colin in France, W. R. Thompson of America, and E. S. Russell of England and Manuel Barbado of Spain. The Aristotelian tradition is preserved rather in philosophic spheres of interest such as the neoscholastic movement at Louvain, the Maritain group at Paris, the De Koninck group at Laval and the various Thomist groups in Europe and America. Both the physical principles of the Aristotelian theory and the possibility of such theory in organizing parts of modern scientific knowledge into a physical system have rather recently been developed in America by H. Kane [26]

[24] E. g. J. Woodger, *Biological Principles* (New York, 1929).

[25] P. Duhem, *Théorie Physique* 2nd ed. (Paris, 1914), p. 24.

[26] H. Kane, "The Nature and Extent of the Philosophy of Nature," *The Thomist*, VII (1944); "The First Principles of Changeable Being," *op. cit.*, VIII (1945).

and V. Smith,[27] but in surveying the literature on the Aristotelian physical theory, one must admit that contemporary writing by no means represents the highly developed theory which the Aristotelian tradition had produced by the time of Albert the Great.[28]

In all fairness to Aristotelian physics, too, it must be admitted that its body of highly developed theory which was the marvel of so many ages before the advent of modern science has never been critically estimated on the basis of being a purely physical system. Its fundamental errors, the most basic of which were corrected by scholastics (e. g. the eternity of motion, the necessity of postulating perfect spheres and movement of the celestial bodies), have never been the chief source of objection to the system. Nor has a lack of the spirit of experiment and the use of the hypothetical method been put forward as formidable objections by enlightened theorists of contemporary physics, for they know that within the Aristotelian theory great stress was laid upon both constant references to physical phenomena for verification and the use of an hypothetical approach when more certain means were lacking.[29] The most serious hurdle which the modern physical theorist has when he is confronted with Aristotelian cosmology is understanding that the physical theory of matter-form and its entire elaboration in organizing the several branches of science is a *purely physical theory.*

Ernst Mach in his history of the science of mechanics shows the weakness of Aristotelian physics in providing dynamic principles, yet such principles must be mathematical-physical principles, with which the matter-form theory was not directly concerned—because it was a purely physical theory.[30] It was of prime concern to Aristotle to point out, in contradistinction to

[27] V. Smith, *Philosophical Physics* (New York, 1950).
[28] Albertus Magnus, *Opera Omnia*, ed. Borgnet (Paris, 1890).
[29] Cf. E. Whittaker, *Space and Spirit* (New York, 1946), pp. 26-27; 57.
[30] E. Mach, *Science of Mechanics* (La Salle, Ill., 1942), pp. 151 ff.

the mathematical physics of the Platonic system, that his science was strictly a univocal physical theory. Aristotle made it very clear how the approach of the mathematician, even in considering the same reality, was an entirely different approach from that of the strictly physical scientist.[31] Yet the critique by which his physical system is set aside by contemporary physicists (apart from the puerile accounts of Aristotelian physical science in standard text-books which do not merit mention) remains a critique on mathematical-physical grounds, and consequently the merits and organizing power of the matter-form theory as a univocal physical theory have not been investigated by modern writers. There are many instances in the histories of physics where this faulty view prevails.

Pierre Duhem's work on the cosmological systems from the time of Plato to Copernicus is perhaps the most comprehensive and scholarly of all the histories of physical science. His extraordinary admiration for the tremendous influence of the Aristotelian physical theory is genuinely shown on every page. Yet even he has not viewed the greatness of Aristotelian physical science according to that characteristic by which the system was truly great and *sui generis*—as a singularly physical theory from beginning to end.[32]

The consequence of this failure to view the Aristotelian system in its proper perspective is that we must now make a new beginning in the field of criticism by going back to the system itself. We must re-examine it for those properties which we set down as manifest signs of the theory needed to integrate our present body of physical knowledge. Nor can our present treatment even approach the thorough handling which the subject demands, but must serve the purpose of merely suggesting the possibilities of further research in this area of theoretical writing.

[31] Aristotle, *Physics*, Book II.
[32] P. Duhem, *Le Système du Monde*, 5 vols (Paris, 1914-17).

The last attempt in the Aristotelian tradition to completely organize every known branch of physical science around the matter-form theory of Aristotle was the monumental work of Albert the Great. There were many commentaries by the Arabs, clarification and purification by Thomas Aquinas, precise elaboration of principles and very general conclusions by men like John of St. Thomas and extension of the theory into detailed special fields, such as Harvey's work on the circulation of the blood, but no attempt to make a comprehensive unification of the entire body of physical science by means of the physical theory of Aristotle. It was in this attempt at unification, not for his original writing, not his tireless investigation, nor his experimentation and discoveries—contrary to the judgment of historians of science—that Albert achieved his greatness. It is to this unified physical theory of Albert, manifestly incomplete and filled with scientific errors which he had not the opportunity to correct, that we must look to obtain some idea of the great possibilities of the theory.

With Albert's masterpiece before us, we look for the properties of a purely physical theory and estimate whether or not the three roles of theory mentioned above can be filled by that theory.

It was of prime importance to Albert that his system preserve throughout a denotative reference to sensible reality, and he elaborates at length on the necessity for a strictly physical system to provide strictly physical definitions which are verified ultimately by sense observation.[84] He clearly shows how his system differs from a mathematical account of the same matter, and how natural phenomenon must be studied first by an essentially qualitative science. The difference between a mathematical definition, a metaphysical definition and a purely physical one is carefully outlined, and the last is used to the exclusion

[84] Albertus Magnus, *op. cit.*, *Physics*, lib. 8, tract 5, c. 2; *De Vegetalibus*, lib. , tract 1, c. 1.

of the other two.[35] But to an investigative process of arriving at precise and detailed knowledge of the physical universe, artificial techniques must be used. These are, in turn, evaluated in terms of the natural, so that the system may retain throughout at least an indirect denotative reference to the sensible universe. In the most formal and strict sense, the physical world is studied by Albert as it is perceived as sensibly changing.[36]

As a consequence, the qualitative theory renders the scientific definitions of motion, time, place, bodies, elements, organism, life, etc. ever accessible to common sense, because the theory never abstracts from the sensibles. One must not conclude as so many do, that such a qualitative theory and its scientific elaboration lack precision and exactitude. A careful reading of how Albert refines more and more his definitions and methods of applying the definitions shows that although mathematical exactitude is not his aim, he achieves the precision required for strictly scientific procedure.[37] He shows clearly that physical science differs from common sense in rigor of method, logic and application of theory.

Not only does Albert perpetuate the design of the Aristotelian system to cultivate precise and accurate physical concepts; he claims for his science the most important prerogative of any scientific system—that it produce a body of demonstrably certain conclusions. This characteristic of Greek science was the contribution of the genius of Aristotle. Before his time, no system of the physical universe claimed to demonstrate with certitude. Plato thought such demonstrations quite outside the realm of possibility. Aristotle discovered both a suitable logic and methodology to make this project possible. He perfected

[35] ***Physics***, lib. 2, tract 1, c. 8.; ***De Caelo et Mundo***, lib. 1, tract 3, c. 4-5.
[36] ***Physics***, lib. 1, tract 1.
[37] ***Physics*** lib. 5, tract 1; ***De Sensu et Sensato***, tract 1, ***De Generatione et Corruptione***, lib. 1, tract 2.

and promulgated the first (and only) strictly demonstrative physical science claiming the physical certitude of its principles. In developing the Aristotelian physical theory, Albert laid special emphasis upon this fundamental characteristic of his science. Physical science must be physically certain, i. e., demonstrated not with mathematical proofs but with physical proofs. Not only does Albert's system possess exactitude and precision of terminology, it retains the logical necessity of certain demonstration, differing from the certitude of mathematics, but nonetheless certain. In so doing, his physical theory fills the first role set down above. His physical science is both physical and scientific.

Even more remarkably Albert's systematic application of the matter-form theory provides the qualifications necessary to fill the second role of physical theory, that of scientifically integrating each branch of science and systematically ordering them among themselves. The formal and material unity of physical science was absolute for Albert the Great. The unbroken continuity of essential unity extended from the very first principles and definitions of his physical science down to the specific natures of every natural phenomena which could be observed. So absolute was that unity that he allowed no distinction, no formal diversification in his science due to difference of investigative technique, logical application or generic and specific consideration. Every natural object was viewed in the light of a single physical theory; hence his entire body of knowledge has a single unity. His science was absolutely one.[38] Yet he applied his physical theory in such a way as to diversify branches of physical sciences according to their special problems. Consistent with his general theory, he divided his particular sciences into the sciences of spatial change and location, where he organized the very insufficient tracts on astronomy, cosmology

[38] Cf. Fr. Anicetus Fernandez-Alonzo, "Scientiae et Philosophia Secundum S. Albertum Magnum," *Angelicum*, XIII (1936), 24-59.

and cosmogony and hypothetical tracts on elements and forces. Next came the particular science of chemical transformation, the theory for which is found in his tract on generation. Besides a tract on chemical elements, admittedly hypothetical, he adds an original tract on the meteorological sciences and minerology. Finally, he organizes the entire body of biological knowledge, ordering the sciences according to their special problems.[39]

These three divisions of the branches of special physical science, of which the physics is but a general treatment of the matter-form theory, preserve the distinction in special methods and problems of the particular sciences, a distinction which has come down to us and still remains valuable in organizing the physical sciences.[40] Historically and doctrinally the main branches of physical science have preserved the distinction among the physical, the chemical and the biological sciences generically delineated by Albert. Thus the diversity of investigative technique in the various branches is preserved, yet allowance is made for application of physical methods and hypotheses to chemistry and biology, and chemical methods to physics and biology. It was an Aristotelian tenet of physical theory that since spatial change was presupposed to all other change, technique proper to a study of spatial change could also be applied to chemical transformation and the organized activity of living things.[41]

Insisting upon the diversity of handling of physical phenomena, Albert found various uses of the hypothesis and the investigative technique of experimentation for which he was so well known. He accepted the hypothesis method in describing the celestial motions and in ascertaining the number and kinds

[39] *Physics*, lib. 1, tract, c. 4; *De Generatione*, lib. 1, tract 1, c. 1; *De Animalibus*, lib. 1, tract 1; *De Sensu et Sensato*, lib. 1, tract 1, c. 1.

[40] Cf. E. J. Cohn, "Research in the Medical Sciences," *American Scientist*, XXXVI, XXXVII (Jan., April, 1949).

[41] Albertus Magnus, *Physics*, lib. 8, tract 3, c. 10; *De Generatione et Corruptione*, lib. 1, tract 1, c. 1.

of the various material elements; he promoted careful investigation and experiment because he insisted upon the necessity of reducing all physical knowledge ultimately to the observable, the physical. Certain artificial techniques could aid in that investigation and verification, and he incorporated those techniques into the unity of physical sciences.[42]

But ultimately, the entire body of physical knowledge, with its broad diversity of problems and methods and hypotheses and experimental techniques, was systematized into a single unity, the unity of the matter-form theory which intrinsically integrated every scientific conclusion. In doing so, Albert's system fills the second role of a purely physical theory.

It was in providing a dynamic physical theory which not only integrated the entire body of physical knowledge but constantly contributed to the perfection of special theory for the several branches of science and promoted new investigative technique that the synthesis of Albert the Great excelled. The lustre of the brilliant integration of known doctrine which the physical theory of Aristotle provided never overawed Albert as it did the Arabs and some of the lesser students of the system. There are some, comments Albert in refuting Aristotle's teaching on the eternity of the world, who think Aristotle is a god and cannot be mistaken, but it is manifest that he can be and is sometimes in error.[43] For Albert, physical theory must make a positive and constant contribution to the investigation of nature. It must provide and encourage every investigating technique useful to make new and solid inductions; it must provide and encourage new hypotheses where the more general approaches cannot penetrate the problems. Physical theory must be a searching, a constant questioning, always standing ready to interpret the results of specialized technique in terms of the theory, to direct

[42] *De Caelo et Mundo*, lib. tract 1, c. 1; *Physics*, lib. 2, tract 1, c. 8. *Lib. Mineralium*, lib. 1-5; cf. also *De Vegetalibus* and *De Animalibus*.
[43] *Physics*, lib. 8, tract 1, c. 14.

and guide new research and to evaluate its results.[44] The function of showing how the quantitative methods reduce to the qualitative theory, how the construct and the experiment reduce to the natural phenomenon, the mathematical-physical to the sensible, the hypothetical and probable to the physically demonstrable, the particular details to the general—this was the dynamic role of the physical theory of Albert the Great.

Let it be restated, in conclusion, that neither the properties of a univocal physical theory in playing its role in unifying our body of physical knowledge, nor the possibilities of the Aristotelian physical theory, have begun to be adequately investigated. The propensity of modern theory to accent beyond moderation the mathematical organization of all the sciences has blinded contemporary theoreticians to the possibilities of combining the virtues of both approaches. As a consequence of this mathematization of physical theory, the advantages and contribution of pure physical theory have remained inaccessible to modern science. It was the purpose of this section to attempt to remove that barrier by a cursory analysis of the possibilities of Aristotelian physical theory.

III

There seems to be another equally serious barrier to the full recognition of the contribution which Aristotelian physical theory could make to modern scientific thought, a barrier which, like the mathematical bias, makes the full force of this theory inaccessible to the contemporary theoretician. It is the propensity to view the Aristotelian physical theory as primarily a metaphysical theory, and the bias prevails over the thought of those who are in the most advantageous position to render the theory accessible. I speak now of modern Aristotelians, the neo-scholastics and a great number of Thomists.

[44] *Lib. Mineralium*, tract 1, c. 1.

It is an ironic commentary on the avowed designs of the neo-scholastics of the turn of the century, that Aristotelian physics was never received and promulgated by them as a distinctively physical system. For it was the concerted effort of the neo-scholastics to revive the vitality of scholastic thought on every level that prompted them to establish the Ecole Saint Thomas d'Aquin at the University of Louvain. And it was especially the problem of modern scientific theory which engaged their most vigorous attention, for it was on the level of physical science that scholastic theory was most heartily rejected.[45] Yet they chose to solve that problem by overlooking the only claim Aristotelian physical theory had or could have on the contemporary scientific mind. Rather than assert its claim as a purely physical system, fully capable of supplying a physical theory which could integrate modern physical science insofar as it is physical, they relegated the physical system of Aristotle and the scholastics to a special department of metaphysics, putting it once and for all out of the reach of contemporary physical science.[46] Many of the original members of the neo-scholastic movement were well-grounded in the physical sciences and therefore knew the problem well. Mercier, Michotte, Nys and Renoirte made the study of contemporary science an integral part of their program at the Ecole. But their theory of science remained as it was conceived, an application of special metaphysics. This was essentially the thought of Duhem, as we have seen; and his remarkable examination of the Aristotelian corpus and its influence brought him to the conclusion that if the object of physical theory was to explain in any way, in contradistinction to a mere economic description, to use the terms of Mach, then physical theory is to be subordinated to metaphysics. Because the physical theory actually did explain

[45] J. S. Zybura, *Present-Day Thinkers and the New Scholasticism* (St. Louis, 1927), pp. 218-221.

[46] F. Van Steenberghen, "Reflexions sur la systèmatisation philosophique," *Revue Neo-Scholastique de Philosophie* (Louvain, 1938), p. 212.

far more than did the mathematical physics which he knew so well, then the two were in totally different camps. Modern physics was physical science; Aristotelian physics was a subordinated branch of metaphysics. The Louvain school of neo-scholasticism embraced that view.

The reason was not far to seek. The neo-scholastics were not primarily interested in the contribution which Thomism could make to science; they rather desired to revivify the whole of Thomistic thought, the cream of which was not physical theory but metaphysics and theology. The critical problem, epistemology, ontology, and social problems were their chief concern, and for them if the problems of modern physics could be shown to have no direct influence upon Thomistic metaphysics, social doctrine, and theology, then they could operate side by side without conflict. Much must be said for the concord they achieved by resolving the problem in this way, but it is manifest that Aristotelian theory could exert no more vital influence upon scientific thought than the metaphysics of which it was supposed to be a special application. Five decades have borne witness to the sterility of scholastic cosmology thus conceived.

Jacques Maritain, also a scientist (working with Dreisch in biology), perceived the sterility of this view of Aristotelian physical theory and also the inconsistency of the view with the Thomistic tradition in scholasticism and began to promulgate the teaching of Aquinas and Albert on the division of the sciences. The physical theory of Aristotle could not conceivably be a subdivision of metaphysics for the simple reason that one dealt with the sensible world as sensible and the other dealt with being as being. Their objects were so diverse that they could not be subordinated as a species to a genius, to particular application of general principles. Metaphysical science and physical science, in the Aristotelian scheme, are distinct and autonomous.[47] Maritain uses the term "natural philosophy" for Aris-

[47] J. Maritain, *The Degrees of Knowledge* (New York, 1938), pp. 44-50.

totelian physical science, and by it he means the science of sensibly changing beings or the science of sensible realities. The term natural philosophy will be retained in describing Maritain's system, because of the important division he later makes in knowledge of sensible reality. In delineating the special field for Thomistic physical theory, separate from the realm of metaphysics, he took the first step in contributing to contemporary thought a more accurate view of Aristotelian physics than had heretofore been presented by the neo-scholastics.

But when Maritain came to compare the physics of Aristotle to the highly developed physical science of our own times, he found what he thought to be radical differences. The physical science of old seemed to be preoccupied with the intelligible content of sensible reality as it was absorbed in contingent existence. The former was deductive and explanatory; the latter was inductive and merely affirmatory. The distinction between the two was absolute and irreducible; they constituted two distinct sciences.[48]

Other properties of these two sciences of physical reality were set down by Maritain, but the main distinction was the direction of movement—the one toward being, ontological physics—the other toward phenomena, empiriological physics. The former he compares with metaphysics as a kind of wisdom about sensible reality; and calls the science *philosophy*, i. e., philosophy of nature. The other sciences, mathematics, the physico-mathematical sciences, the experimental sciences (which includes biology and paleontology and psychology of the experimental type), he brackets together under the name *science*. Thus he perfects the distinction between philosophy and science for which the Maritain group is well known today.[49] It is this distinction between the philosophy of nature and science, intended to clarify and make precise the domain of Aristotelian physical theory, that rends the seamless robe of a univocal quali-

[48] *Ibid.*, pp. 42-43.

[49] *Ibid.*, p. 58.

tative physical science of Albert and Thomas Aquinas. This distinction between science and the philosophy of Aristotle based upon irreducible formal objects, the one seeking an ontological explanation, the other phenomenal affirmation or description, had the effect of driving a wedge between the physical theory of Aristotelian science and the entire domain of contemporary scientific questions. Just as the physics of the neo-scholastics at Louvain was a special application of metaphysics, and as such completely rejected by the scientists who would have nothing to do with such speculation, so the Aristotelian physics of Maritain was sufficiently ontologized and segregated from contemporary science that modern scientists have no patience with its speculations.[50]

Insofar as contemporary physical science proceeds under the light of mathematics, quantifying the qualitative, and showing only relations among measurables, and applying mathematics to physical reality only to account for new quantitative relations, there is no disagreement among modern Aristotelians as to its autonomy and distinction from the purely qualitative physical science of Aristotle. The "mixed sciences" of astronomy, perspective, optics, music, and many others were explicitly enumerated by Albert as mathematically physical and distinct sciences from his general physical theory. But the foundation of the distinction was simply that these sciences were specifically mathematical and only terminatively physical; physical sciences which were truly physical must be specifically and terminatively physical. There was *no other foundation for distinction* in the science about sensible reality in the thought of Albert and Aquinas, as has been so thoroughly demonstrated

[50] Witness to this impatience was Prof. Bridgman's report (to Prof. Martain's plea for recognition of philosophical values) that he was interested only in that which could be dealt with scientifically. Quoted in P. Conway's and G. Friel's article "Farewell, Philosophy," THE NEW SCHOLASTICISM, XXIV (1950), 372.

by Fr. A. Fernandez-Alonzo.[51] To place such a distinction destroys the essential unity of the univocal qualitative theory of Aristotle and completely sterilizes the theory in relation to contemporary physical problems.

It is difficult to understand, therefore, and harder still to share, the enthusiasm of Prof. Adler for this Maritain distinction of philosophical physics and empiriological physics (or philosophy and science) when he writes:

> He (Maritain) has specified the distinct provinces of philosophy and science in terms of the difference in their formal objects and the consequent difference in their methods of inquiry, appropriate in each case to these objects. He has done all this without rendering philosophy and science incommunicable, or isolating each from significant contact with the other. If all scholastics carried on their philosophical inquiries in the light of Maritain's distinctively modern conception of philosophy—of its autonomy and its limits, its proper principles and problems—it seems to me that this would favor their making a substantial contribution to the peculiarly modern progress of philosophy.[52]

The distinction does not render Thomistic philosophy and contemporary science incommunicable any more than did the over-ontological view of the Louvain group. The two can, if they wish, get together. But it will still be the case of an Aristotelian explanatory system sitting in judgment like a wise man who is, unless he is approached, otherwise indifferent. The contemporary theorist, fully imbued with a Kantian independence, has no stomach for the kind of judgment which follows:

> We have the right to hold that Thomist philosophy rather than any other is in the position to supply the sciences with the metaphysical framework where they can follow out at ease the necessities of their own proper development and which will do them no violence.[53]

There is not, just as there was not in the time of Mach and

[51] Fr. Anicetus Fernandez-Alonzo, "Scientiae et Philosophia Secundum S. Albertum Magnum," *Angelicum*, XIII (1936), 24-59.

[52] M. J. Adler, "The Next Twenty-five Years in Philosophy," THE NEW SCHOLASTICISM, XXV (1951).

[53] Maritain, *op. cit.*, p. 83.

Duhem and Poincaré, a necessary isolation between philosophy and science, but a realistic glance at the tenuous contact between Thomistic philosophy and contemporary science hardly gives one reason to call the contact more significant now than it was then. To seek, in the relationship between Aristotelian-Thomist philosophy and contemporary science "a concord in general, a good understanding, a natural friendship, of which the liberty of science, the ease with which it spreads its wings, is the best indication," [54] is to seek a static panacea far short of the mark set by the tradition of Albert and Thomas Aquinas who measured the significance of the contact between general theory and particular investigation by the intrinsic interdependence of principles and conclusions. Nor do the summaries of the progress of Thomism and the trends in contemporary philosophy appearing in the same jubilee issue in which Prof. Adler writes indicate the contact of Thomism with modern science has been significant. There is no indication in either summary that Thomism has contacted the scientific field at all.[55]

The authors of the article "Farewell, Philosophy" appearing in the previous issue of THE NEW SCHOLASTICISM seems to take a more realistic view of this contact between scholastic philosophy and science when they write:

> Even should a scholastic philosopher somehow make his 'philosophy,' as distinguished from 'science' respected, he is still at a tremendous semantic disadvantage. For while the word 'science,' as applied to the contemporary sciences, has retained, whether deservedly or not, much of the pristine vigor of its original connotation as 'a certain knowledge of causes,' the word 'philosophy' has become disastrously impoverished. In losing its connotation of science, the knowledge of causes, it has become itself a lost cause. Today it is sufficient simply to emphasize the now conventional distinction between science and philosophy in

[54] Maritain, *loc. cit.*

[55] C. Hart, "Twenty-Five Years of Thomism," pp. 3-45; J. Collins, "A Quarter-Century of American Philosophy," pp. 46-80. THE NEW SCHOLASTICISM, XXV (1951).

order to confer upon any philosophical arguments the stigma of being non-scientific. The philosopher is thus doomed before he even opens his mouth.[56]

There is left in Thomistic thought no autonomous and well-developed physical theory to come to grips with contemporary science; contemporary science is too busy to be interrupted and bothered with ontologized theory. There is concord, there is a mute friendliness. But with a few impersonal gestures the association ceases. There is, in passing, one other rather significant development in contemporary non-scholastic thought which bears directly on this matter of the distinction between philosophy and science. Pierre Duhem, who regarded himself as a Thomist, had great influence upon the thought of his friends E. Mach and H. Poincaré. And it was Duhem's insistence upon the distinction between physics and metaphysics which so impressed the founders of the "new positivism." The distinction was the Wolffian-Kantian division between phenomenon and its description on the one hand and rational explanation on the other. Whatever statements attempted to explain phenomena, said Duhem, belonged to metaphysics.[57]

This teaching became one of the foundation stones for the positivism of the Vienna Circle for it provided just the frame of reference needed to relate all the conflicts between science and religion and political ideologies.[58] Thomists and Kantians and the new positivists have so much in common that it is sometimes difficult to tell them apart:

In extreme cases this common ground may be so extensive that one can read hundreds of pages of a neo-Thomist or a neo-Kantian without recognizing that he is not a positivist of the new type. The most outstanding example is the French physicist and philosopher, Pierre

[56] P. Conway and G. Friel, *op. cit.* (1950), 372.

[57] P. Duhem, "Physique et Metaphysique," *Review des questions*, XXXVI, LV (1897).

[58] P. Frank, *Modern Science and its Philosophy* (Cambridge, 1949), pp. 16-17.

Duhem, whom we mentioned above. His writings are among the most valuable contributions of the new positivism. He was warmly recommended by Ernest Mach as a positivist. Many scientists were never aware that Duhem's background was straight Aristotelian or rather Thomistic metaphysics.[59]

But despite the valuable contribution of Duhem's distinctions, it was the " iron curtain " between science and philosophy which appeared in both the neo-Thomist and neo-Kantian camps that rendered them useless to contemporary thought. Says Frank:

> The neo-Thomist and neo-Kantian schools reacted to the revolutionary changes that have arisen in science since the turn of the century by establishing a kind of 'iron curtain' between science and philosophy. But none of these schools, and, as a matter of fact, none of the schools of traditional philosophy, of the idealistic or realistic type, were able to make a valuable contribution toward integrating the new science of the twentieth century into the general framework of human thought. [60]

It was this failure to make the desired contribution, says Frank that gave rise to logical positivism in 1918. Unwilling to put new wine of modern science into the old bottles of traditional philosophy, a new movement began with one purpose in mind, to erect a new philosophy to replace the traditional systems of the Aristotelian or Kantian type, and to provide a theory of science which would unify it. Logical positivism was born.[61]

The most ironical turn came when, faced with the alternative of either renouncing the unification of science or introducing metaphysical propositions into science, the Unity of Science Movement of the Vienna group adopted the proclamation of Ernst Mach that unity of science can come only by the elimination of metaphysics. And in this way did the distinction, made to protect metaphysics, backfire to destroy its influence upon contemporary science completely.

From all that has been said it is impossible not to conclude

[59] *Ibid.*, p. 25. [60] *Loc. cit.* [61] *Loc. cit.*

that the metaphysical bias in conceiving Aristotelian physical science as something other than a purely univocal, essentially unified physical science as described above has made its contribution to the unification of contemporary physical science ineffectual and insignificant. The failure to present a purely physical theory, and work out the relationship of this theory to all the physical conclusions of modern science, to supply a dynamic and intrinsic unity of physical doctrine, capable of assimilating in a formal way all the truly physical findings of science, has been the crowning failure of Thomism in the field of physical science.

In the interest of accuracy and in all fairness to the wonderful accomplishments in other branches of knowledge for which both the neo-scholastics and the Maritain group of Thomists are responsible, it ought to be made doubly clear at this point that the only issue with which we are concerned in this paper is the failure of Thomism in the field of physical science. Nor must there be any misunderstanding concerning the importance of Prof. Maritain's realization of the necessity of demanding the autonomy of natural philosophy as distinct from metaphysics; for the first step in contributing to contemporary physical problems had to be the clear statement of an autonomous physical science. His end in view was manifestly to provide a general physical theory which would embrace contemporary science insofar as that was possible. But his ontologized conception of natural philosophy and an over-phenomenalistic view of twentieth-century science made him, we assert, create the essential division which makes that end unattainable.

There are increasing numbers of Thomists, however, who have abandoned this division between philosophy and science, both because it seems not to be found in the traditional thought of Albert and Aquinas and because it positively impedes the possibility of developing a physical theory useful to contemporary science. Perhaps this is the group, working independ-

ently in various countries, to which Prof. Adler sadly alludes.[62] They have adopted for their end the same objective as the Louvain group and the followers of Maritain—to attempt a solution to questions which contemporary positive science raises by applying the doctrines of the Thomist school. Their approach, however, departs significantly from the view-points of the above mentioned groups. In the light of the needs of contemporary physics and the completely unsuccessful attempts to bring about an essential unity of physical sciences either by a mathematical theory or a metaphysical theory, the approach of these Thomists suggests a fresh possibility that some contribution to such a unity might come from their efforts.

Though we speak of a group of Thomists here, it cannot be in the sense of a concerted effort to carry out a definite program of research along agreed upon general principles and method. The men of whom we now speak are independent workers on the problem of physical theory, united only by a specific point of view on the question under consideration. Consequently, their approach can only be described from their writings contrasted to the two approaches mentioned above. Though in detail and in special interest, these Thomists may differ considerably, they have the following general view-point in common.

The general physical doctrine and all the details of the Aristotelian physical science are strictly physical and pertain in no way, even in the most general parts, to metaphysics. In the whole of the physics, there is no concern for a distinction between the intelligible or more ontological parts and the branches which deal with the specific details. The univocal unity of the physical science is everywhere insisted upon, a unity which precludes the possibility of differentiating parts of the science on the basis of greater or less concretion, induction or deduction in logic, experience or experimentation, proximate or ultimate

[62] M. Adler, *op. cit.*, p. 94.

causes.[63] This science is a univocal science and is concerned with sensible reality as that reality is qualitatively sensible. All of the principles of the science, then, and all of the conclusions are seen in this light and no other. The procedure of this science, that is, from the general to the particular, is never able to bring about an occasion for a new scientific treatment; however concrete the science becomes, it studies sensible realities as they are changeable. Concretion presents no distinct problem as it does for the Maritain group.

Furthermore, this science of physics extends by nature to a knowledge of concrete species, specific parts of this sensible universe, and is not accomplishing its end until it has investigated physical reality to that ultimate extent. It is evident that to know the parts of the universe scientifically whether they be the parts of inanimate or animate reality, the science must utilize every technique available to extend its reaches to those details.

It is manifest, then, that investigative technique is the proper tool of this qualitative science, the same investigative technique which is so valuable to quantitative science today. Yet the science remains one as it extends the use of methods of investigation to the details of sensible reality and incorporates its induction into the science.[64]

Thorough analysis reveals, however, that a large section of contemporary scientific problems are solved by quantitative investigative technique. Though mathematical physics and mathematical biology ultimately attempt to say something about the physical universe and its specific parts, they are specifically distinct approaches to the physical world from the qualitative physical science. To what extent, then, can the methods of this mathematical technique of investigation be of service to a quali-

[63] A. Fernandez-Alonso, *art. cit.*

[64] H. Kane, "The Nature and Extent of the Philosophy of Nature," *The Thomist*, VII (1944), 229-30.

tative science? How can mathematics, in other words, be a useful tool in a strictly physical theory? This problem necessitates a thorough investigation of the nature of mathematical physics and its comparison to a strictly physical science.[65] At the same time a detailed study of the possibilities of tactual sense knowledge of physical reality have to be made to ascertain what precise relation qualitative investigation of physical reality and a quantitative study bear to each other. The limits of a qualitative science and something of this relationship have been set down by Prof. De Koninck,[66] and some work on the use of the hypothesis in science has been begun in order to see the role which this investigative technique plays in both qualitative and quantitative science.[66a] The relationship between the qualitative and quantitative experiment must also be investigated in order to understand not only to what extent the mathematized and controlled experiment so highly developed today actually achieves a physical knowledge which can be integrated into the body of physical science by a qualitative theory.

On the side of the physical theory itself, much remains to be investigated before it can be presented as a solution to the problem of integration. First the theory itself as it is applied to concrete problems of the several branches must be thoroughly examined for flaws in its assumptions and elaboration; then the details of the system have to be corrected and refined, for there are erroneous developments in every physical system, and where

[65] Cf. B. Mullahy, "Subalternation and Mathematical Physics," *Laval Théologique et Philosophique*, II (1946).

[66] Professor De Koninck's highly developed views concerning the importance of tactual sense knowledge in the development of true physical science, the relationship between qualitative and quantitative technique and the possibilities as well as the limitation of qualitative science can be found in "Les sciences experimentales sont-elles distinctes de la philosophie de la nature," *Culture*, IV, 465-476; and more fully in his "Introduction à L'Etude de L'Ame," *Laval Théologique et Philosophique*, III (1947), 9-65.

[66a] Simard, E., "L'Hypothèse," *Laval Théologique et Philosophique*, III (1947), 89-120.

hypotheses have proved fruitless and inconsistent with observation, they have had to be abandoned. A group of Thomists have begun the survey of such a work, and plan to investigate the entire details of the Aristotelian physical theory in the light of contemporary physical knowledge. On the other hand, the possibilities of the special theory of the concrete branches of the physical science of Aristotle as extending to the problems of physics and chemistry and biology are being investigated in detail, so that a statement of the precise way in which the general and special theory of a qualitative science embrace the problems of contemporary physical science might be formulated.[67]

It is not the detailed work of this new attempt to contribute to modern thought and science which inspires optimism, for both concerted effort and well worked out details are everywhere lacking, but it is the new viewpoint which shows such promise. The central theme of this view is that Aristotelian physical theory is a univocal and essentially integrated physical system and formally extends to all physical knowledge however elaborated by highly refined investigative techniques. As the techniques improve and the insight into the structure and function of the physical universe becomes more profound, so also does the possibility of extending this physical theory increase. What is more, the investigation of nature becomes the direct interest of this theoretical integration. The general principles of Aristotelian physical science are no longer regarded as philosophic (in the sense of being ontological) whose function is to judge of the validity of the conclusions of contemporary sci-

[67] Survey in preparation by the Pontifical Institute of Philosophy at the Dominican House of Studies; River Forest, Ill., where the *Albertus Magnus Lyceum for Physical Science* has been founded to engage in research on Aristotelian and contemporary theory. Lectures, seminars and a summer school for graduate scientists form its basic program. The following works on scientific theory will soon be available: W. B. Ashley, *Aristotle's Special Physical Science: Physics and Chemistry*, R. J. Nogar, *An Analysis of Contemporary Physical Theory*, and W. B. Mahoney, *The Notion of Quantity in a Thomistic Evaluation of the Sciences.*

ence; they become dynamic directives for further application of investigative technique, vitally in touch with the very details of physical science. Aristotelian physical science comes into its own by being from beginning to end a strictly physical system.

If our analysis of the need of modern science for a comprehensive and coherent unity and integration is correct, then there is before us the serious problem of finding such a system that would provide that unity. That system must establish contact with the world of physical reality at every juncture. In the words of Max Planck:

> Since exact science deals with measurable magnitudes, it is concerned primarily with those sensory impressions which admit of quantitative data—in other words, the world of sight, the world of hearing, and the world of touch.[68]

It must, furthermore, integrate each branch of physical science within and without in terms of its general theory. Its theory must be essentially united to the experimental research of contemporary science, in constant touch with its investigation, providing rules of correspondence between the data and the constructs. The system must, in fine, not only promote by a dynamic set of qualitative principles the full development of general and special theory and a complete elaboration of special technique proper to each branch of physical science, but also this system must render the whole body of physical knowledge intelligible in the light of our qualitative experience, thus integrating physical science with the other meaningful areas of our intellectual and spiritual life.

We have shown what the properties of such a theory must be, and we have attempted to show that neither mathematical theory nor metaphysical theory can fill that role. There is left but one possibility, a purely physical theory, a univocal physical system. It has been the object of this paper to present the

[68] M. Planck, *Scientific Autobiography* (New York, 1949), p. 87.

necessity of this theory, the possibility of this theory and the merits of the only physical theory thus far proposed.

By pointing out the pitfalls both of a tendency to over-quantify our scientific knowledge in an attempt at unity and to over-ontologize in that same attempt, it is hoped that the way for a univocal physical theory might be made a bit easier. That such a physical theory is both necessary and possible is our conviction; to the end that such a physical theory might be perfected and proposed to contemporary science this paper has been dedicated.

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Necessary and Contingent Being in St. Thomas

by Thomas B. Wright

I. Introduction

THE *tertia via* of St. Thomas for the existence of God has been known to be misunderstood by some manualists who reproduce it only in part. These authors omit the second part of the proof where St. Thomas goes from the existence of a necessary being whose necessity is *per aliud* up to the existence of a necessary being whose necessity is *per se*.[1] In other words, they go directly from the existence of contingent being to the existence of God, making God the only necessary being, and all beings other than God contingent. This omission is due to a fundamental misunderstanding of St. Thomas's conception of necessary and contingent being.

Such authors generally consider contingent being to be being which does not have a sufficient reason for its existence in itself. Actually, this definition is the definition of *caused* being rather than *contingent* being. The only being which can have a sufficient reason for existence in itself is one that is its own existence, or one whose essence is to exist. Therefore, the fact that a being does *not* have a sufficient reason for existence in itself does not make it a *contingent* being, but a *participated* being or one that is *caused*.

To return to these manualists's exposition: a contingent being is one which does not have a sufficient reason for its existence. For, since it is possible to exist or not to exist, there is no rea-

[1] J. S. Hickey, *Summa Philosophiae Scholasticae*, III, p. 25: "Res mundanae sunt contingentes; atqui res contingentes existere nequeunt, nisi existit ens necessarium, a quo in existendo dependeant; ergo existit ens necessarium, id est Deus." Cf. G. H. Joyce, *Principles of Natural Theology*, pp. 78-85; also R. P. Phillips, *Modern Thomistic Philosophy*, II, pp. 285-287.

son for its actual existence. On the other hand, a necessary being is one which *does* have the sufficient reason for its existence, or one which is self-existent. To put it another way: they identify necessary being with self-existent being, and contingent being with caused or participated being. This is not the doctrine of St. Thomas, and it is also why such authors have erroneously considered this proof another form of the argument from efficient causation.[2]

Actually, the proof as advocated by these writers only proves the existence of a necessary being, not of God, and this criticism has been made by many modern philosophers, notably Kant. That the necessary being in the argument is God is not clear, since there is no repugnance for a caused being to be necessary being. To say that, if it is necessary, it is no longer contingent, begs the question. There is simply no reason why all caused beings must be contingent, and St. Thomas saw this truth, as will be shown below.[3]

Consequently, the *tertia via* as thus formulated, really becomes an inconclusive argument for the existence of God unless it is previously known and maintained that contingent being is identical with caused being, and necessary being with self-existent being. Obviously, there is a conceptual diversity between these two pairs; but besides this, it must be denied that they have a parallel reference. In other words, all necessary being is not self-existent, and all contingent being is not all caused being. The position that says otherwise tends to identify the concept of necessary being and self-existent being which, as will be shown below, is not warranted by the facts, nor is it the doctrine of St. Thomas. This position makes, consciously or unconsciously, the two following unwarranted assumptions:

[2] G. H. Joyce, *ibid.*, pp. 78-79.

[3] This and all subsequent statements in parts I and II concerning St. Thomas's doctrine will be merely asserted as opposed to prevalent conceptions. They will be technically demonstrated in parts III, IV, and V.

(1) God is the only absolutely necessary being.

(2) All created being is contingent.

In addition to this confused version of the *tertia via* by some philosophers, we find that even in St. Thomas's formulation of the argument from contingency there arises a serious difficulty. It is this: in the *tertia via* St. Thomas says that since contingent beings are possible to exist or not to exist, sometimes they *do not exist.* From this it would seem to follow that if all mundane beings were contingent, then sometimes they do not exist. This seems to prove that they did not exist from eternity, but must have begun to exist with a determinate time. However, it is well known that Aquinas maintains that it cannot be demonstrated by reason alone that the world did not exist from eternity, or that it began to exist with a determinate time. Yet, here in the *tertia via*, the argument from contingency definitely states that contingent beings sometimes do not exist; in other words, that they did not exist from eternity but began to exist with a determinate time. Such an apparent inconsistency is quite unbecoming to the doctrine of the Angelic Doctor.

Therefore, these two items, namely, that a portion of St. Thomas's *tertia via* is sometimes omitted by certain writers, as well as the fact that the *tertia via* apparently contradicts Thomas's doctrine of the non-repugnance of the eternity of the world, both indicate that St. Thomas's concepts of 'necessary' and 'contingent' being have been misunderstood. It is the purpose of this paper to explain his concepts of the 'necessary' and the 'contingent,' thereby showing why the *tertia via* has been misunderstood by some and why it also *seems* to contradict the non-repugnance of the eternity of the world.

II. Necessary and Contingent Being in the *Tertia Via*

The *tertia via* in its complete formulation suggests, first of all, that not all beings other than God are contingent or possible

when it states that only *certain things* are found to be possible to exist and not to exist.[4] It is reasonable to believe that if St. Thomas considered all created beings to be contingent, he would have used the word *omnia* instead of *quaedam.* It seems rather that he was singling out only a special group of created beings. This seems even more plausible, since he immediately adds that the reason why we know certain beings are possible or contingent beings is "because certain things are found to be generated and corrupted."[5] This would suggest that all generable and corruptible things are contingent; and since this class of beings is so extensive, it is probable that only generable and corruptible things are contingent. The expression of the *tertia via* does not explicitly say so, but it suggests that this is the case.

Furthermore, the first part of the demonstration concludes that all beings could not be contingent but that there must be something necessary *in things.*[6] This does not refer to God because St. Thomas here mentions two kinds of necessary being: one which has the cause of its necessity from something else and one which does not have the cause of its necessity, but is necessary *per se* and is the cause of necessity to the others. The latter being Thomas calls God.

Thus, a closer look at the *tertia via* suggests three things:

(1) For Thomas, all created beings are not contingent.

(2) He thinks some created beings are necessary.

(3) Contingent being is generable and corruptible being.

[4] *Summa Theologiae,* I, q. 2, a. 3: "Invenimus enim in rebus *quaedam* quae sunt possibilia esse et non esse," italics mine. In future references *ST* will denote the *Summa Theologiae, CG* will denote the *Summa Contra Gentiles,* and *De Pot* will stand for the *Quaestiones Disputatae, De Potentia Dei.*

[5] *Ibid.*; ". . . cum quaedam inveniantur generari et corrumpi, et per consequens possibilia esse et non esse."

[6] *Ibid.*; "Non ergo omnia entia sunt possibilia: sed oportet aliquid esse necessarium *in rebus.*" Italics mine.

Although some authors leave out the second part of Aquinas's argument, as was said above, yet many do mention this second part which distinguishes between a being that is necessary *per se* and one that is necessary *per aliud*.[7] Nevertheless, some still show that they do not fully understand St. Thomas on the nature of necessary and contingent being. For example, Boyer says that the argument which St. Thomas called the argument from the 'possible and the necessary,' can also be called the argument from contingency, since the name 'contingent' is suitable not only to those things which have no necessity but also to those which receive their necessity from another.[8] Boyer thus seems to exclude absolute necessity from created things, apparently basing absolute necessity upon the identity of essence and existence. However, the identity of essence and existence in God does not make His necessity *absolute*, but it *does* make it *per se*. There is nothing repugnant for necessity being simultaneously *received* and *absolute*. Absolute necessity is due to the absence of any potency for non-existence, and this can take place in created or participated being, not being confined to self-existent being. In other words, a necessary being is not one whose essence is to exist, but one that cannot not-exist.

Boyer also says that the argument is valid, even if there were no corruptible being. It might be valid but it would not be the argument of St. Thomas any longer, nor an argument from contingent being, but rather one from caused or participated being. A further indication that Boyer considers all created

[7] E. Gilson, *Le Thomisme*, 5th ed. (Paris, 1947), p. 104; H. Grenier, *Cursus Philosophiae* (Quebec, 1944), II, pp. 242-243; J. Gredt, *Elementa Philosophiae* (Fribourg, 1936), II, p. 197; C. Boyer, *Cursus Philosophiae* (Paris, 1936), II, pp. 317-321; F. X. Maquart, *Elementa Philosophiae*, III (Paris, 1938), part ii, pp. 304-310.

[8] C. Boyer, *ibid.*, p. 318: "Argumentum quod a S. Thoma vocatur ex possibili et necessario, dici quoque potest ex contingentia, quia nomen contingentis convenit tum iis quae nullam necessitatem habent, tum iis quae necessitatem suam ab alio recipiunt."

beings to be contingent is seen in his phrasing of several metaphysical questions.[9]

The same thing is true for Maquart. After explaining and criticizing the positions of various authors such as Geny, Descoqs, Boyer, and Chambat, he makes the following statement:

> . . . secundum se contingens quidem non implicat inceptionem nec corruptibilitatem.[10]

If contingent being means anything for St. Thomas, it means one that began to exist through generation and that can stop existing through corruption. A contingent being is a generable and corruptible one. Thus, it is seen why subsistent forms and celestial bodies are called ingenerable and incorruptible, namely, because they are not seen to be generated and corrupted. This is not *why they are* incorruptible, but *how they were discovered* to be incorruptible. The reason for the incorruptibility of subsistent forms is that they are immaterial and, therefore, are not subject to physical corruption or generation. The reason for the incorruptibility of celestial bodies [11] is that, although they are material, yet the potency of the matter is exhausted by one form; and they do not have a potency for another form, substantial or qualitative, although they do have potentiality for another *ubi* or location. Thus, they are incorruptible and unalterable, and for Aristotle, they were eternal, though they were

[9] *Ibid.*, p. 263: "Utrum in entibus contingentibus essentia et esse distinguantur realiter"; *ibid.*, p. 275: "Utrum subsistentia in entibus contingentibus realiter distinctum ab essentia et esse."

[10] F. X. Maquart, *op. cit.*, III, part ii, p. 309.

[11] St. Thomas according to the principles of the ancient physics taught that the celestial bodies were incorruptible because they did not consist of the four elements, but of a unique fifth element. Thus, the matter of the inferior bodies was different from that of the celestial bodies. As Garrigou-Lagrange says (*De Deo uno*, p. 218 [Paris, 1938]), spectral analysis shows that the stars have the same chemical combinations as the earthly bodies. Consequently, this doctrine is mentioned throughout the paper as that of St. Thomas, and not as an established truth.

not Pure Act, since they were mobile. From revelation St. Thomas knows that they are not eternal. From reason he knows that they *need* not be eternal, although they *may* be. For, though they did not begin to exist through generation (which definitely would exclude their eternity), yet they did begin to exist through creation which may or may not be from eternity according to the pleasure of the divine will.

Another indication which shows that Maquart thinks that all created being is contingent is the following quotation:

> Entia creata sunt *contingentia*, seu quae possunt esse et non esse, ac proinde non sunt esse per essentiam, sed *habent* esse ab alio. . . .[12]

The fact that a being is contingent does not make it "have its existence from another." Again, notice the tendency to identify necessary being with self-existent being, as well as contingent being with participated being.

As will be shown below, for St. Thomas a contingent being cannot be one which does not begin to exist through generation and which does not have the possibility of corruption. It is for this reason that he called subsistent forms and celestial bodies beings which have a necessity of existence, and an absolute necessity at that. Maquart, as possibly some others, thinks that God is the only absolutely necessary being, and that all created being is contingent. This is not the teaching of St. Thomas as now shall be technically demonstrated.

III. Necessary and Contingent Being in the *De Potentia*

St. Thomas is very explicit about necessary and contingent being in the *Quaestio disputata de potentia*. The problem arises when he takes up the question of annihilation. An objection is made that God cannot annihilate because there are certain creatures which have a necessity of existence and in which there is

[12] Maquart, *op. cit.*, III, part ii, p. 81.

no possibility for existence and non-existence.[13] Such creatures are the incorruptibles, namely, incorporeal substances and celestial bodies. In all of these latter creatures there is no possibility for non-existence. Therefore, the objection goes on, if left to themselves, and if the divine action is withdrawn, they would not pass into non-existence. So it seems that God could not annihilate these incorruptibles which have a necessity of existence.

St. Thomas answers by saying that even though such beings in themselves have no possibility for non-existence, yet they would pass into non-existence if the action of their cause should cease. Thus, their non-existence would be possible with respect to God's power of not-giving existence, but it would not be possible with respect to the beings themselves.[14]

St. Thomas is firm in maintaining that such beings have an *absolute necessity* of existence. So when answering another objection which maintains that all creatures depend upon the divine will and, therefore, are not absolutely necessary, he declares that such incorruptibles receive an absolute necessity of existence. These beings are produced with a nature such that there is not any possibility of non-existence in them. This can take place because all creatures exist in the way that God wants them to exist.[15] Here is explicit expression that there is abso-

[13] *De Pot*, V, 3, obj. 8: "Quaecumque ergo creaturae habent necessitatem essendi, in eis non est possibilitas ad esse et non esse. Hujusmodi autem sunt omnia incorruptibilia, ut sunt substantiae incorporeae et corpora caelestia. Ergo omnibus his non est possibilitas ad non esse. Si ergo sibi relinquantur, divina actione substracta, non deficient in non esse; et sic Deus non videtur quod possit ea annihilare."

[14] *Ibid.*, ad 8um: "Non tamen removetur quin ipsa natura in qua non est possibilitas ad non esse habeat necessitatem essendi ab alio; cum quidquid perfectionis habet, sit ei ab alio; unde cessante actione suae causae, deficeret, non propter potentiam ad non esse quae in ipso sit, sed propter potestatem quae est in Deo ad non dandum esse."

[15] *Ibid.*, ad 12um: ". . . licet creaturae incorruptibiles ex Dei voluntate dependeant, quae potest eis esse praebere et non praebere; consequuntur tamen ex divina voluntate absolutam necessitatem essendi, in quantum in tali natura causantur, in qua non sit possibilitas ad non esse; talia enim

lute necessity of existence in some creatures. There is no mention of identity of essence and existence as constituting absolute necessity. Identity of essence and existence produces the *perseity* or uncausedness of absolute necessity but not its *absoluteness.* Absolute necessity can be received or participated *per aliud.* Absolute necessity does not mean Pure Act, nor identity of essence and existence, nor self-existent being.

In another part of the *De Potentia,* where he deals with the question of the world's eternity, Aquinas overtly says that some things in the world have an absolute necessity. An objection is made that celestial bodies are not absolutely incorruptible (and, therefore, absolutely necessary, as will be seen later), because they would fall into nothingness unless they were maintained in existence by the power of God. To this St. Thomas answers that, *simpliciter* speaking, it cannot be said that a celestial body is corruptible (contingent) simply because it would fall into non-existence if it were not conserved by God. However, the fact that a creature is maintained in existence by God is due to the divine immobility, and *not* to a necessity of nature in such a way that it could be said to be absolutely necessary. For it is necessary only on the supposition of the divine will which has immovably established it. It must be admitted, though, that a celestial body can be said to be corruptible *secundum quid,* namely, upon the condition that God would not maintain it in existence.[16] Briefly, St. Thomas says that annihilatability does not make a being contingent or possible *simpliciter* but only

sunt cuncta creata, qualia Deus esse ea voluit, ut Hilarius dicit in libro de Synodis."

[16] *De Pot.* III, 17, ad 3um: "Ad tertium dicendum, quod non potest dici, simpliciter loquendo, caelum esse corruptibile propter hoc quod in non esse decideret, si a Deo non contineretur. Sed tamen quia creaturam contineri in esse a Deo, dependet ex immobilitate divina, non ex necessitate naturae, ut possit dici quod sit necessarium absolute, cum sit necessarium solum ex suppositione divinae voluntatis, quae hoc immobiliter statuit; potest concedi secundum quid corruptibile esse caelum, cum hac scilicet conditione, si Deus ipsum non contineret."

secundum quid. On the other hand, conservability does not make it absolutely necessary either. For the conservability of a creature does not depend upon a necessity of nature but upon the will of God. In other words, St. Thomas's reply tells us that the distinction between absolute necessity and absolute contingency is not based upon God's power of annihilation or conservation at all.

It is clear, therefore, that God makes some creatures which have an absolute necessity of existence, not in the sense that God *had* to make them of necessity, since He makes them through His will which is free; but because He has willed some creatures to have a necessary existence (celestial bodies and incorporeal substances) and others to have contingent existence (generable and corruptible things).

St. Thomas was not ignorant of the position that maintained God as the only necessary being and all others as possible or contingent. He ascribed this position to Avicenna.[17] Yet he preferred the position of Averroes who admitted the existence of creatures, which have no possibility for non-existence. Averroes said that creatures, which would have a possibility for non-existence by nature, could not acquire 'sempiternity' from something extrinsic in such a way that they would become 'sempiternal' by nature. For they *would* and *would not* have a possibility for non-existence at the same time.

Aquinas agreed with Averroes because he believed that matter was the root of contingency. A thing is only in potency for existence or non-existence by reason of its matter. Since matter cannot exist without form, it cannot be in potency to non-exist-

[17] *De Pot.* V, 3, corpus: "Avicenna namque posuit, quod quaelibet res praeter Deum habebat in se possibilitatem ad esse et non esse. Cum enim esse sit praeter essentiam cujuslibet rei creatae, ipsa natura rei creatae per se considerata, possibilis est ad esse; necessitatem vero essendi non habet nisi ab alio, cujus natura est suum esse, et per consequens est per se necesse esse, et hoc Deus est."

ence, except insofar as existing under one form, it is in potency for another form.[18]

There are two ways by which a thing might not have a possibility for non-existence. The first is when the thing is merely a form subsistent in its own existence, as are incorporeal substances which are completely immaterial.[19] Such things are subsistent not in the sense that they are subsistent existence itself, but in the sense that they do not require a further subject in which to exist, but *have* existence by virtue of themselves. They are not their own existence but they *have* it in themselves.

That these subsistent forms cannot not-exist is due to the fact that they cannot be separated from themselves. For in material things the form is the principle of existence because matter cannot exist without it; thus, a material thing is able to not-exist by the separation of the form.[20] However, a form cannot be separated from itself and so has no possibility for non-existence.

The second way for a thing to have no possibility for non-existence is when its matter has no potency for another form.

[18] *Ibid.*: "Commentator vero contrarium ponit, scilicet quod quaedam res creatae sunt, in quarum natura non est possibilitas ad non esse; quia quod in sua natura habet possibilitatem ad non esse, non potest ab extrinseco sempiternitatem, ut scilicet sit per naturam suam sempiternum. Et haec quidem positio videtur rationabilior. Potentia enim ad esse et non esse non convenit alicui nisi ratione materiae, quae est pura potentia. Materia etiam, cum non possit esse sine forma, non potest esse in potentia ad non esse, nisi quatenus existens sub una forma, est in potentia ad aliam formam."

[19] *Ibid.*: "Dupliciter ergo potest contingere quod in natura alicujus rei non sit possibilitas ad non esse. Uno modo per hoc quod res illa sit forma tantum subsistens in esse suo, sicut substantiae incorporeae, quae sunt penitus immateriales. Si enim forma ex hoc quod inest materiae, est principium essendi in rebus materialibus, nec res materialis potest non esse nisi per separationem formae; ubi ipsa forma in esse suo subsistit nullo modo poterit non esse; sicut nec esse potest a se ipso separari."

[20] Cf. *ST*, I, 75, 6: "Unde materia secundum hoc acquirit esse in actu quod acquirit formam: secundum hoc autem accidit in ea corruptio, quod separatur forma ab ea. Impossibile est autem quod forma separetur a seipsa. Unde impossibile est quod forma subsistens desinat esse."

Here the total potentiality of the matter is exhausted by one form. This occurs in celestial bodies in which there is no contrariety of form. Consequently, only those things have a possibility for non-existence in nature which have *matter subject to contrariety.*[21] *Matter subject to contrariety*—this is the fundamental basis of contingent or possible being, and not participatedness, nor createdness, nor *annihilatibleness.*

It is evident that some things have a necessity of existence because all possibility has been removed from them.[22] It is also clear that God is not the only absolutely necessary being, and it is also not true that all creatures, merely by the fact that they are *caused*, are *contingent.*

The possibility inherent in a contingent being is predicated with respect to a potency in the *thing itself*, rather than in the *maker of the thing.*[23] This is the important distinction of St. Thomas which preserves absolute necessity in creatures. The above explained doctrine is based on the possibility of the *thing made* rather than on the potency of the *maker* or agent.

The Avicennian position seems to follow from an emphasis on God's power to annihilate, viz., an extrinsic cause. Many scholastics seem similarly preoccupied in preserving God's power to annihilate by calling a being contingent or possible

[21] *De Pot*, V, 3, corpus: "Alio modo per hoc quod in materia non sit potentia ad aliam formam, sed tota materiae possibilitas ad unam formam terminetur, sicut est in corporibus caelestibus, in quibus non est formarum contrarietas. Illae ergo solae res in sua natura possibilitatem habent ad non esse, in quibus est materia contrarietati subjecta."

[22] *Ibid.*: "Aliis vero rebus secundum suam naturam competit necessitas essendi, possibilitate non essendi ab earum natura sublata."

[23] *Ibid.*: "Respondeo dicendum, quod in rebus a Deo factis dicitur aliquid esse possibile dupliciter. Uno modo per potentiam agentis tantum; sicut antequam mundus fieret, possibile fuit mundum fore, non per potentiam creaturae, quae nulla erat; sed solum per potentiam Dei, qui mundum in esse producere poterat. Alio modo per potentiam quae est in rebus factis; sicut possibile est corpus compositum corrumpi. Si ergo loquamur de possibilitate ad non esse ex parte rerum factarum, dupliciter circa hoc aliqui opinati sunt." St. Thomas goes on to explain the two opinions of Avicenna and Averroes, preferring, as was seen above, that of Averroes.

with respect to the potency of the agent. St. Thomas and Averroes favored calling a thing contingent or possible with respect to something intrinsic to its *nature*, rather than to something outside that nature. As Aquinas says, the latter position seems 'more reasonable.' It would seem that in order that a term be predicated *simpliciter* of a subject it should signify something intrinsic to that subject. For instance, an animal is called 'healthy' *simpliciter*, while its food would be called 'healthy' *secundum quid*. Health intrinsically resides in the animal organism, but does not in the food.

A being can also be called 'possible' in another way besides with respect to an active potency or a passive potency. That a creature not-exist is not impossible as if it should imply a contradiction or 'discoherence of terms.'[24] In this sense everything is 'possible' which does not contain a contradiction.

St. Thomas seems to think that 'possible' and 'contingent' are equivalent terms.[25] However, modern logicians usually regard them as subcontraries. In this way, 'possible' means 'possible *to be*' and 'contingent' means 'possible *not to be*.' The 'possible' is the contradictory of the 'impossible,' while the 'contingent' is the contradictory of the 'necessary.' In other words, contingency seems best characterized by a possibility for *non-existence* rather than by a possibility for *existence*. A contingent being is considered as actually existing but capable of non-existing; while a possible being is considered as actually not existing, and therefore, in itself, it does not have a possibility for existence, since in itself it does not yet exist. It

[24] *Ibid.*: "Creaturas autem simpliciter non esse, non est in se impossibile quasi contradictionem implicans (alias ab aeterno fuissent. Et hoc ideo est, quia non sunt suum esse.") St. Thomas does not mean to say that creatures are definitely known not to be eternal because they are not God; rather, he merely shows that it is not the *nature* of a creature to be eternal, although *de facto* a creature might or might not be eternal. It is the *fact* of a creature's eternity which he maintains cannot be demonstratively shown one way or the other.

[25] Cf. *In Metaphysicam*, IX, lec. 9 (n. 1870, Cathala ed.): "Sed id quod potest non esse, contingit non esse. Haec enim duo aequipollent."

presupposes, however, matter and an efficient cause by which a new form is educed from the potency of the matter. In this way, a possible being is a generable being. Consequently, a being that is creatable is not 'possible,' simply because there exists an agent who could create it. It is not possible *simpliciter* but only *secundum quid*. When it is the latter, the possibility is predicated with respect to the *active* potency of an agent creator, not with respect to a passive potency. This passive potency is matter subject to contrariety. For Aquinas the root of contingency of being is matter subject to contrariety, and the root of necessary being will be the absence of matter subject to contrariety. This is the doctrine of the *De Potentia*.

IV. Necessary and Contingent Being in the *Contra Gentiles*

In the *Contra Gentiles* St. Thomas leaves no doubt that matter subject to contrariety is the basis of contingent being. In one text he says that there is potency for existence only in those things which have matter subject to contrariety.[26] Then he completely confirms our previous analyses with chapter 30 of Book II, entitled, "*Qualiter in rebus creatis esse potest necessitas absoluta*."

Aquinas says that, although all things depend upon the will of God as their first cause (which does not operate through necessity), nevertheless absolute necessity is not excluded from things so that we would have to confess that all things are contingent. Rather, there are some things in creation for which it is simply and absolutely necessary to exist.[27]

[26] *CG*, II, 25, Primo: "Unde in illis solis est potentia ad esse quae materiam contrarietati subiectam."

[27] *CG*. II, 30: "Licet autem omnia ex Dei voluntate dependeant sicut ex prima causa, quae in operando necessitatem non habet nisi ex sui propositi suppositione, non tamen propter hoc absoluta necessitas a rebus excluditur, ut sit necessarium nos fateri omnia contingentia esse:—quod posset alicui videri, ex hoc quod a causa sua non de necessitate absoluta

These necessary things do not have any possibility for non-existence because God brought them into existence in such a way that there is no potency for non-existence in their nature.[28] Things are contingent because the matter in them is in potency for another form. Therefore, things in which there is no matter, or in which the matter cannot have another form, do not have any potency for non-existence.[29]

From this doctrine it is seen that an absolutely necessary being is also an incorruptible one. And since matter subject to contrariety of form is the focal point of necessary and contingent being, it is also clear why a generable thing must also be corruptible, and an incorruptible thing must also be ingenerable. The reason is that matter that *is not* subject to contrariety could never exist under another form, since, if it could, it would then *be* subject to contrariety. Hence, an incorruptible is not generated, although it may begin to exist through creation. On the other hand, if matter *is* subject to contrariety, a thing that is generated must become corrupted, and a thing that has been corrupted must have been generated. All of this does not follow if an extrinsic agent should intervene. For instance, a supernatural agent could make something that is corruptible by nature become incorruptible, as the bodies of the resurrected will become incorruptible through glory.[30]

St. Thomas goes on to point out that it cannot be said that all creatures have a potency for non-existence simply from the

fluxerunt: cum soleat in rebus esse contingens effectus qui ex causa sua non de necessitate procedit. Sunt enim quaedam in rebus creatis quae simpliciter et absolute necesse est esse."

[28] *Ibid.*: "Illas enim res simpliciter et absolute necesse est esse in quibus non est possibilitas ad non esse."

[29] *Ibid.*: "Quaedam autem res sic sunt a Deo in esse productae ut in earum natura sit potentia ad non esse. Quod quidem contingit ex hoc quod materia in eis est in potentia ad aliam formam. Illae igitur res in quibus vel non est materia, vel, si est, non est possibilis ad aliam formam, non habent potentiam ad non esse. Eas igitur absolute et simpliciter necesse est esse."

[30] *De Pot.* V, 3, ad 8um.

fact that of themselves they tend to nothingness because they are made out of nothing. However, they tend to nothingness with respect to an active potency. Therefore, there is no potency for non-existence in created things, but rather there is a potency in the Creator either for giving them existence or for stopping the influx of existence. This is because God does not produce things by a necessity of nature but through His will.[31]

St. Thomas gives the following reason for saying there is absolute necessity in things:

> From the fact that created things proceed into existence by the divine will, it is necessary for them to be such as God has wished them to be. By the fact that God is said to have produced things into existence by His will and not by necessity, it does not prevent Him from having wished some things to exist which will exist of necessity, and others which will exist contingently. By this means there is an ordered diversity in things. Therefore, nothing prevents certain things which have been produced by the divine will from being necessary.[32]

It is now obvious that Aquinas did not consider all creatures contingent. For he admits that creatures can have a real absolute necessity. Notice, though, that they *have* their necessity. The essential distinction here is not between absolute and conditional necessity, but between *per se* absolute necessity and *per aliud* absolute necessity. Although a creature *has* necessity,

[31] *CG.* II, 30: "Si autem dicatur quod ea quae sunt ex nihilo, quantum est de se, in nihilum tendunt; et sic omnibus creaturis inest potentia ad non esse:—manifestum est hoc non sequi. Dicuntur enim res creatae eo modo in nihilum tendere quo sunt ex nihilo. Quod quidem non est nisi secundum potentiam agentis. Sic igitur et rebus creatis non inest potentia ad non esse: sed Creatori inest potentia ut eis det esse vel eis desinat esse influere; cum non ex necessitate naturae agat ad rerum productionem, sed ex voluntate, ut ostensum est."

[32] *Ibid.*: "Item. Ex quo res creatae ex divina voluntate in esse procedunt, oportet eas tales esse quales Deus eas esse voluit. Per hoc autem quod dicitur Deum produxisse res in esse per voluntatem, non per necessitatem, non tollitur quin voluerit aliquas res esse quae de necessitate sint et aliquas quae sint contingenter, ad hoc quod sit in rebus diversitas ordinata. Nihil igitur prohibet res quasdam divina voluntate productas necessarias esse."

still it is an absolute necessity. Actually, it is greater testimony to the perfection of God to say that He can make creatures which exist with an absolute necessity. At any rate the concept of necessary being is not repugnant to the concept of created being. St. Thomas writes:

> It pertains to the divine perfection to endow created things with its similitude except with respect to those things which are repugnant to created existence. For it is the mark of a perfect agent to produce something similar to itself insofar as it is possible. Necessary existence simply is not repugnant to the concept of created existence. Nothing prevents something from being necessary but yet having the cause of its necessity, as the conclusions of demonstrations. Therefore, nothing prevents certain things from being so produced by God that nevertheless it is simply necessary for them to exist. Rather, this testifies to divine perfection.[33]

Furthermore, just as it was shown that *matter* is the basis of contingent or possible being because it is subject to contrariety, so also *form* is the root of necessary being because it is not subject to contrariety. Form is act, and through it things actually exist. Consequently, from it comes necessity of existence in certain things. This happens either because these things are forms not in matter, and thus there is no potency for non-existence in them because through their form they always have the power of existing. This is the case of separated substances. Or, this necessity of existence occurs because the forms of some things by their perfection complete the total potency of the matter, so that no potency for another form remains, and there-

[33] *Ibid.*: "Ad divinam perfectionem pertinet quod rebus creatis suam similitudinem indiderit, nisi quantum ad illa quae repugnant ei quod est esse creatum: agentis enim perfecti est producere sibi simile quantum possibile est. Esse autem necesse simpliciter non repugnat ad rationem esse creati: nihil enim prohibet aliquid esse necesse quod tamen suae necessitatis causam habet, sicut conclusiones demonstrationum. Nihil igitur prohibet quasdam res sic esse productas a Deo ut tamen eas esse sit necesse simpliciter. Immo hoc divinae perfectioni attestatur."

fore, none for non-existence.[34] This is the case of celestial bodies.

Many have tried to say that God is the only absolutely necessary being because all creatures exist with a conditional or hypothetical necessity, since they depend upon the will of God. However, this violates St. Thomas's principle that necessity and contingency of existence is predicated according to existence and not according to action. Thus, even things which are *absolutely* necessary in existence are *conditionally* necessary with respect to the action of the divine will. God did not of necessity will them to exist, but once he did will them to exist, it was necessary for them to exist. St. Thomas gives an example of this kind of necessity in created things. He says that it is conditionally necessary for a saw to be made out of iron, if it is to do the work of a saw.[35] Similarly, the *fact* of an absolutely necessary being's existence is conditionally necessary upon the action of the divine will, but the existence itself is absolutely necessary.

The fundamental distinction which explains these two types of necessity is the distinction between *mode* of existence and *fact* of existence. All created things are conditionally necessary with respect to the fact of their existence, for God can only will His own existence with absolute necessity, that is, a necessity of nature. Elsewhere St. Thomas tells us that not only that which is made depends upon the divine will but also the mode of that which is made.[36]

[34] *Ibid.*: "Forma autem, secundum id quod est, actus est: et per eam res actu existunt. Unde ex ipsa provenit necessitas ad esse in quibusdam. Quod contingit vel quia res illae sunt formae non in materia: et sic non inest eis potentia ad non esse, sed per suam formam semper sunt in virtute essendi; sicut est in substantiis separatis. Vel quia formae earum sua perfectione adaequant totam potentiam materiae, ut sic non remaneat potentia ad aliam formam, nec per consequens ad non esse: sicut est in corporibus caelestibus."

[35] *Ibid.*: "Alio vero modo est ex fine necessitas secundum quod est posterius in esse. Et haec est necessitas non absoluta, sed conditionata: sicut dicimus necesse fore ut serra sit ferrea si debet habet serrae opus."

[36] *CG*, I, 85: "Efficacia autem divinae voluntatis exigit ut non solum

Similarly, in the sphere of action, God not only wills that some actions take place, but He wills some to take place *freely*, namely, in voluntary agents, and some *necessarily*, namely, those in natural agents.[37] That contingent events take place at all is not absolutely necessary; but once God has decided that they will take place, they are conditionally necessary. St. Thomas gives the example: when Socrates is seen to sit, it is necessary for him to sit; but that he sit at all is contingent.

Consequently, it must be said that the existence of created things is necessary or contingent according to the divine will. The *fact* of existence will always be conditionally necessary. Existence as *made* or caused is never absolutely necessary because it presupposes God's *making*. God's making is an action of His will; and since His will is free, it is not determined to make. However, if God wills to make, it is necessary for him to make, and He cannot not-make. This is a conditional, hypothetical, or suppositional necessity. This results from the immutability of the divine will. This gave rise to the distinctions between *necessitas consequentis* and *necessitas consequentiae*, *sensus divisus* and *sensus compositus*. In the conditional proposition, "If Socrates is seen to sit, he sits," we have a conditional necessity or one of *consequence* or fact rather than one of *consequent* or nature. Change this conditional proposition to a categorical one and we get, "What is seen to sit is necessary to sit," which, if understood of the dictum or compositely, is true. This means that if the action of sitting is understood as already 'joined' to the subject, it is necessary as a fact. If the proposition is understood of the subject of the action as separated from the action, then the statement is false because the action is

sit quod Deus vult esse, sed etiam ut hoc modo sit sicut Deus vult illud esse." Cf. *ST*, I, 19, 8, c.: "Cum igitur voluntas divina sit efficacissima, non solum sequitur quod fiant ea quae Deus vult fieri; sed quod eo modo fiant, quo Deus ea fieri vult."

[37] Cf. *CG*, III, chapters 72 and 73.

not essentially necessary to its subject. This is the *sensus divisus.*[38]

Finally, it should be observed that 'necessary' and 'contingent' are modes of existence before they are modes of action. For existence is prior to action. Therefore, these modes should be predicated with respect to existence, and if they are, all creatures are not then contingent simply because they are held in existence by the conserving *action* of God; instead, some are necessary because they consist of form only, or because they have a form that completes the potentiality of matter. Thus, contingent being is based on matter whose potentiality is not exhausted by one form. In other words *form* is the basis of *necessary* being, and *matter subject to contrariety* is the basis of *contingent* being.

V. Conclusion

Necessary being and possible or contingent being for St. Thomas were not parallel to creator and creature, nor to pure act and participated being, uncaused cause and caused cause, unmoved mover and moved mover. Instead, they were parallel to incorruptible and corruptible, or ingenerable and generable. This must be the case since a being is called 'possible' according to something intrinsic and this must be passive potency.[39]

[38] *CG*, I, 67, Praeterea: ". . . si unum quodque a Deo cognoscitur sicut praesentialiter visum, sic necessarium erit esse quod Deus cognoscit, sicut necessarium est Sortem sedere ex hoc quod sedere videtur. Hoc autem non necessarium est absolute, vel, ut a quibusdam dicitur, *necessitate consequentis*: sed sub conditione, vel *necessitate consequentiae*. Haec enim conditionalis est necessaria: *Si videtur sedere, sedet*. Unde et, si conditionalis in categoricam transferatur, ut dicatur, *Quod videtur, sedere necesse est sedere*, patet eam *de dicto* intellectam, et *compositam*, esse veram; *de re* vero intellectam, et *divisam*, esse falsam.

[39] Cf. *In Metaphysicam* IX, lec. 9 (n. 1868): ". . . sed loquitur hic de potentia passiva, secundum quam aliquid dicitur possibile esse et non esse, vel simpliciter, vel secundum quid." See also *CG*, II, 55, third Adhuc: "Tum quia res dicuntur necessariae et contingentes secundum potentiam quae est in eis, et non secundum potentiam Dei, ut supra ostensum est."

It is really due to proximate and secondary causes that contingency or possibility exists in the world, otherwise everything would be necessary.[40] The intrinsic principle of contingent being could either be form or matter. But form is act, and nothing is called 'possible' and therefore, 'contingent,' with respect to act. Matter is pure potency, and hence, it must be according to passive potency that a thing is called 'possible.'

Contrariety is indispensable for the notion of the 'possible.'[41] For, whatever can be can not-be.[42] A strict 'possible,' in other words, is a generable and corruptible one.

A 'creatable and annihilatable' is possible only with reference to an active potency, that of God. It is not a strict possible because it is possible with respect to an *extrinsic* principle. Absolute possibility or contingency depends upon an intrinsic principle just as absolute necessity does. For St. Thomas says that absolute necessity is due to an intrinsic principle, either formal or material. The corruptibility of composites is abso-

[40] *CG*, III, 72: "Ex causis autem proximis aliqui effectus dicuntur necessarii vel contingentes, non autem ex causis remotis." Cf. *ST*, I, 19, 8 and I, 22, 4. See also *In Perihermeneiam* I, lec. 14: "Sunt autem differentiae entis possibile et necessarium; et ideo ex ipsa voluntate divina originantur necessitas et contingentia in rebus et distinctio utriusque secundum rationem proximarum; ad effectus enim, quos voluit necessarios esse, disposuit causas necessarias; ad effectus autem, quos voluit esse contingentes, ordinavit causas contingenter agentes, idest potentes deficere. Et secundum harum conditionem causarum, effectus dicuntur vel necessarii vel contingentes, quamvis omnes dependeant a voluntate divina, sicut a prima causa, quae transcendit ordinem necessitatis et contingentiae."

[41] *CG*, II, 30: "Unde manifestum est quod omnia quae vel contrarium habent, vel ex contrariis sunt, corruptibilia. Quae autem huiusmodi non sunt, sempiterna sunt."; *CG*, I, 15, Amplius: "Omne autem quod est possibile esse, causam habet: quia, cum de se aequaliter se habeat ad duo, scilicet esse et non esse, oportet, si ei approprietur esse, quod hoc sit ex aliqua causa."

[42] *CG*, II, 30: "Et quia materia, secundum id quod est, ens in potentia est; quod autem potest esse, potest etiam et non esse: ex ordine materiae necessario res aliquae corruptibiles existunt; sicut animal quia ex contrariis compositum est, et ignis quia eius materia est contrariorum susceptiva."

lutely necessary because of their material principle. 'Angles equal to two right angles' is a property absolutely necessary to a triangle because of its formal principle.[43] The same thing is true for possibility or contingency since it is the opposite of necessity. Strict contingency will be due to an intrinsic principle, namely, matter, because form is ruled out, as it is act.[44] Passive potency is potency for existence; active potency is potency for action. A 'creatable and annihilatable' is so called because of the creative and conserving action of God. The action of God is free. He is not necessitated to create anything. However, a 'creatable and annihilatable' is endowed with a conditional necessity. For, although the divine will is free to create or not to create, once it has decided to create, it cannot not-create. Prescinding from the divine will's decision to create, however, God *can* not-create, or reduce something to nothing, by withdrawing his creative and conserving action. Contrariety of the will thus enables the possible and the necessary somehow to meet. It is conditionally *necessary* for God not to annihilate any creature, although it is *possible* for Him to do so. The divine omnipotence must be preserved as well as the divine immutability.

St. Thomas gives us an example of this conditional necessity in human action. He says that it is possible for Socrates to sit and not to sit. But while he is sitting, it is impossible for him not to sit, although he still has the power to stand. Socrates will never stand while he is sitting, though. Similarly, God will never annihilate anything, even though He still has the power to do so.[45] It is a contradiction for God to will to create

[43] *ST*, I, 82, 1: "*Necesse est enim quod non potest non esse.* Quod quidem convenit alicui, uno modo ex principio intrinseco: sive materiali, sicut cum dicimus quod omne compositum ex contrariis necesse est corrumpi; sive formali, sicut cum dicimus quod necesse est triangulum habere tres angulos aequales duobus rectis. Et haec est *necessitas naturalis et absoluta*."

[44] *ST*. I, 75, 6: "Esse autem per se convenit formae, quae est actus."

[45] *De Pot*, V, 4: "Voluntas enim Dei, quamvis, absolute considerata, ad

something which would be annihilated, because He would be *willing* and *not-willing* the existence of the same thing. God's will is immutable and whatever He has chosen from eternity is necessary, although it was not necessary for Him to make that choice.

All creatures are conditionally necessary with respect to God's active potency, but only those which lack matter subject to contrariety are absolutely necessary with respect to the passive potency intrinsic to the creature.

A being is possible with reference to a passive potency. Considered as 'possible to be,' it is called 'generable' or merely 'possible'; considered as 'possible not to be,' it is called 'corruptible' or sometimes 'contingent.' However, for St. Thomas 'contingent' and 'possible' seem equivalent.[46]

What is important in this whole business is that absolute necessity and possibility must be predicated with respect to an intrinsic principle, because absolute necessity and absolute possibility are modes of *being* and are intimately connected with it.[47] All other necessity is *secundum quid* because it depends

opposita se in creaturis habeat, eo quod non magis ad unum quam ad alterum obligatur; ex suppositione tamen facta aliquam necessitatem habet. Sicut enim in creaturis aliquid quod se ad opposita habet, necessarium creditur positione aliqua facta, ut Socratem possibile est sedere et non sedere; necessarium tamen est eum sedere, cum sedet; . . . Et quia ejus voluntas immutabilis est; si ponitur aliquando eum aliquid velle, necessarium est ex suppositione illud eum semper velle, licet non sit necessarium ut velit quod sit semper, quod vult esse aliquando."; *CG*, II, 25: "Huiusmodi autem potest quidem Deus vel facere vel velle, si eius voluntas vel potentia absolute consideretur, non autem si considerentur praesupposita voluntate de opposito: nam voluntas divina respectu creaturarum necessitatem non habet nisi ex suppositione, ut in Primo ostensum est. Et ideo omnes istae locutiones, *Deus non potest facere contraria his quae disposuit facere*, et quaecumque similiter dicuntur, intelliguntur *composite*: sic enim implicant suppositionem divinae voluntatis de opposito. Si autem intelliguntur *divise*, sunt falsae: quia respiciunt potentiam et voluntatem Dei absolute."

[46] *In Metaphysicam* IX, lec. 9, n. 1870.

[47] *ST*, I, 22, 4, ad 3um: "Et considerandum est quod necessarium et contingens proprie consequuntur ens, inquantum huiusmodi." *In Periher-*

solely upon an extrinsic cause, either the *end* or the *agent*. The necessity from an agent can either be the violent necessity of coaction which forces an action contrary to the natural inclination of a being; or it may be the conditional necessity of action resulting from the choice of a free will.

It is true that even the absolute necessity of being which is found in some creatures is due *ultimately* to an extrinsic cause, God. There must be an intrinsic foundation for such necessity, however, and St. Thomas has pointed out on several occasions that contingency and possibility in creatures is due to secondary or proximate causes rather than ultimate or remote ones.[48] The problem was to explain the relation between God's will and things other than Himself without removing contingency from things on the one hand, and imposing absolute necessity upon things on the other hand. St. Thomas ends up by saying that the divine will cannot be the point of reference of contingency and necessity. Ultimately, of course, contingency and necessity are due to the divine will, for He has willed some things to happen necessarily and others contingently. Obviously, this discussion seems to pertain more to *action* rather than to *being*. There seems to be question here of events, happenings, actions rather than things, substances, beings. But action presupposes being, and for necessary things necessary causes must be postulated. Since these causes are necessary, they must either have the cause of their necessity in themselves or from another. If they have it from another, there still has to be an intrinsic principle of this necessity. Applying St. Thomas's principles that necessity and contingency are more due to a proximate cause than a remote one, we can say that the necessity of these caused beings is more due to their intrinsic principles than to their ultimate cause, the divine will.

meneiam I, lec. 14, n. 22: "Sunt autem differentiae entis *possibile* et *necessarium*."

[48] Cf. *ST*, I, 19, 8 and I, 22, 4; CG, I, 85 and III, 72; *In Perihermeneiam* I, lec. 14.

The intrinsic cause of necessity is form [49] and form is act. It is well known that existence belongs to act *per se*.[50] Any being which is pure form must exist, cannot not-exist, and does not need any potency or subject in which to inhere. Therefore, it is subsistent, incorruptible, and absolutely necessary. Aristotle called such a being a separated substance, the Arabs frequently called them intelligences, and St. Thomas, while identifying them with the angels, refers to them as subsistent forms, incorporeal substances, intellectual substances, and similar expressions.[51] These substances subsist in their own existence. This does not mean that they are their own existence or that they are subsistent existence. For subsistent existence as well as subsistent form can only be one,[52] since they each lack matter, the principle of numerical distinction. Form in subsistent forms is both *that which* and *that through which* it exists. In other words, form has existence *per se*, whereas matter has existence *per formam*. Subsistent form is not pure act because it *has* existence rather than *is* its own existence. It *is not* existence *per se*, but has existence *per se*. Matter is not only not existence *per se*, but does not even *have* existence *per se*.[53]

Consequently, form is not in potency for existence while matter is. Neither can form have a potency for non-existence, but matter does. Matter can also have a potency for existence but form cannot. It is no contradiction to say that form cannot be in potency for existence simply because, considered in itself, it is potency with respect to its existence which is considered as

[49] *CG*, II, 30; *ST*, I, 50, 5 and I, 75, 6; *CG*, II, 55: "Forma enim manente, oportet rem esse: per formam enim substantia fit proprium susceptivum eius quod est esse."

[50] *ST*, I, 50, 5: "Esse autem secundum se competit formae: unumquodque enim est ens actu secundum quod habet formam."; I, 75, 6: "Esse autem per se convenit formae, quae est actus."

[51] Cf. *De Substantiis Separatis*.

[52] *CG*, II, 52: "Illud ergo quod est esse subsistens, non potest esse nisi unum tantum."

[53] *ST*, I, 50, 5: "Materia vero est ens actu per formam."

its act. It is not pure act, because its existence is participated; that is, it is not its own existence is participated; that is, it is not its own existence. It is potency with respect to its existence, but it is not in potency for its existence. It would have to have a potency for another form to be in potency for existence. This would be absurd. Only matter can be in potency for another existence or for non-existence; it alone is in potency for another form. In other words, form is neither generable nor corruptible, but must exist, while a material composite or natural body is both generable and corruptible because its matter may lose one form and receive another. Thus, it is matter subject to contrariety which is the basis of possible or contingent being, and it is form which is the basis of necessary being.[54]

The solution to the problems mentioned in the introduction is now quite clear. For, if all authors would realize that a necessary being is an ingenerable and incorruptible, and a contingent one is a generable and corruptible, then they would not omit the second part of the *tertia via* which argues from one kind of necessary being to another kind of necessary being. If they would recognize that a contingent being is not a creatable and annihilatable one, but instead a generable and corruptible one, they would see that the *tertia via* does not move directly from created being to Creator, but rather from corruptible being to incorruptible. In the second part it then goes from a created incorruptible to the Creator. Since the starting point of the *tertia via* is not created being as such but only corruptible being, it is clear that it does not endanger the non-repugnance of the world's eternity. The *tertia via* does not say that all created being sometimes does not exist; rather, it says that all generable and corruptible being sometimes does not exist. For the *tertia via* does not refer to all created being, since it does not include the ingenerable and incorruptible beings, namely, subsistent forms and celestial bodies. These latter did not begin to exist

[54] *CG*, II, 30; ST, I, 50, 5, ad 3um.

through generation but through creation. It is because they are created that St. Thomas says human reason cannot demonstrate that they did not exist from eternity. Creation does not include a beginning in time in its concept. It is a universal beginning, the beginning of a thing in its total *esse*. Therefore, it abstracts from the *hic et nunc*. If St. Thomas had not had a clear-cut concept of creation, he would have been forced to maintain that the incorruptibles were eternal, as Aristotle did. For Aristotle absolute coming-to-be is generation, and absolute ceasing-to-be is corruption. The Stagirite did not write a work entitled *De Creatione et Annihilatione!*

St. Thomas was prevented from declaring that the incorruptibles were eternal by two things: the Catholic Faith and the concept of creation. Faith alone tells us definitely that the world did not exist from eternity. Creation can be from eternity but it is also able not to be so. It is quite possible that celestial bodies and subsistent forms have always existed, and that generation and corruption has been going on from eternity, since prime matter is also ingenerable and incorruptible. It is only Faith that tells us that they have not existed from eternity.

There are three basic reasons why contingent or possible being cannot be a creatable and annihilatable for St. Thomas.

1. St. Thomas derived his concept of possible and contingent being from Aristotle who based it on generation and corruption, since he never had a clear-cut idea of creation, if any.
2. A thing should be called possible or contingent with respect to something intrinsic and not extrinsic.
3. The act of creation is conditionally necessary and is not the cause of contingency and absolute necessity; these latter are due to proximate and secondary causes rather than remote and ultimate ones.

The results of this study can be summarized as follows:

1. God is not the only absolutely necessary being.
2. Not all created beings are contingent.
3. Incorporeal substances and celestial bodies are absolutely necessary created beings.
4. Contingent beings are the generables and corruptibles.[55]
5. Neither participatedness, createdness nor causedness make a being contingent or prevent it from being absolutely necessary.
6. Although some beings are absolutely necessary, still their necessity as well as their being is participated or *per aliud*, and thus depends upon a *per se* necessary being Who is His own existence.
7. The root of contingent being is matter subject to contrariety.
8. The root of necessary being is form, either subsistent or perfectly completing the potency of matter.
9. The *tertia via's* starting point is generable and corruptible being *only*, and not all created being.
10. That a contingent being should not exist sometimes is in no way opposed to the non-repugnance of the eternity of the world, since Aquinas admits the existence of certain things absolutely necessary *in rebus*.

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[55] *CG*, I, 15, Amplius: "Videmus in mundo quaedam quae sunt possibilia esse et non esse, scilicet generabilia et corruptibilia."

From the Secretary's Desk

The Twenty-Sixth Annual Meeting

THE TWENTY-SIXTH Annual Meeting of the American Catholic Philosophical Association will be held at Hotel Statler, Cleveland, Ohio, on Easter Tuesday and Wednesday, April 15th and 16th, 1952, under the patronage of His Excellency, Archbishop Hoban, and the Catholic universities, colleges and seminaries of the Cleveland area. The general theme of the meeting will be "Philosophy and the Experimental Sciences." Dr. Vincent E. Smith of University of Notre Dame will give the introductory paper, "Abstraction and the Experimental Method," at the opening morning session. The second paper at this session will be "Philosophy and Experimental Physics," by Dr. George Speri Sperti of the Institutum Divi Thomae of Cincinnati, Ohio. Rev. Dr. Lucien Dufault, O.M.I., of the Oblate Fathers, Natick, Mass., has been invited to read the first paper on "Philosophy and Biological Evolution," for the second morning session, and Professor Raymond McCall of DePaul University, Chicago, Ill., will have the second paper on "Philosophy and Experimental Psychology." The Annual Association Address will be given by Professor Etienne Gilson of the Institute of Mediaeval Studies, Toronto, Canada. Professor Gilson will receive the second award of the Cardinal Spellman-Aquinas Medal. Professor Anton C. Pegis, director of the Pontifical Institute of Mediaeval Studies, Toronto, will give the citation. The Association Address and the Presidential Address by Rev. Dr. Francis X. Meehan of St. John's Seminary, Brighton, Mass., will constitute the program of the Annual Dinner session.

Last May, all members were extended invitations to volunteer (1) to contribute a thirty minute paper at any one of the six Round Tables on one of the suggested subjects indicated in the invitation, with reply directly to the chairman of the section not later than October 15, 1951; a one-hundred-and-fifty word summary indicating the proposed manner of treating the subject to be included with the reply; (2) or to write a thirty-minute commentary on a paper, it being understood that the paper would be in the hands of the proposed commentator not later

than February 1, 1952. The list of the Round Tables, names and addresses of respective chairmen, and proposed subjects, as stated in the invitation, are as follows: A. Logic and Method Section (Rev. James Conway, S. J., Woodstock College, Woodstock, Md., chairman): Suggested Subjects: (1) "Science and Induction"; (2) "Philosophy and Symbolic Logic." B. Metaphysics Section (Rev. John W. Flynn, S. J., Fordham University, New York, N. Y., chairman): Suggested Subjects: (1) "The Meaning of Participation in St. Thomas"; (2) "The Nature of Secondary Efficient Causality"; C. Moral and Political Philosophy Section (Professor James Collins, St. Louis University, St. Louis, Mo., chairman): Suggested Subjects (1) "The Role of a Proposed Practical Intellectual Virtue of Wisdom"; (2) "Adequacy of Recent Descriptive Naturalistic Accounts of Moral Obligation." D. Philosophy of Nature Section (Rev. George P. Klubertanz, S. J., St. Louis University, chairman); Suggested Subjects: (1) "The Analysis of Temporal Duration"; (2) "Constant and Predictable Inheritance of Non-Specific Perfections in Living Things." E. History of Philosophy Section (Rev. Maurice J. Grajewski, O. F. M., St. Francis College, Burlington, Wis., Chairman): Suggested Subjects: (1) "The Development of the Doctrine of the Mean in Philosophical Speculation"; (2) "The New Edition of Duns Scotus' 'Ordinatio' and Its Doctrinal Significance." F. Philosophical Problems Section (Rev. Carl W. Grindel, C. M., St. John University, 75 Lewis Ave., Brooklyn, N. Y., Chairman): Suggested Subjects: (1) "The Relation of Physical Activity to Essence and Ends"; (2) "Hylomorphism in the Light of Modern Science."

Those chosen to read papers will be notified by November 1, 1951 and thereupon agree to have the full copy of the paper in the hands of the chairman concerned not later than January 15, 1952. Those chosen to write a thirty-minute commentary on a paper will receive the papers shortly after January 15th and agree to have the commentary ready for the Annual Meeting on April 15th and 16th, 1952, at which time copies of all papers must be filed with the Association Secretary for publication in the Annual *Proceedings*. The delay in publication of this year's *Proceedings* was due to the failure of a few contributors who kept the papers they read at the New York meeting for more than a month after the close of the meeting. Yet these members had nine months in which to prepare their papers. There has also been complaint about readers of papers who go far beyond the half-hour limit for any paper read at the meeting and who thus make discussion of

such papers practically nil. The President of the Association is asked to exercise his authority in this regard. The Secretary asks the various chairmen of the Round Table sections for our Cleveland meeting to see that the summaries of papers in their section be sent to him not later than November 1, which is the deadline for material for the January issue of THE NEW SCHOLASTICISM. He also asks the four contributors to the general morning sessions to send their one hundred and fifty word summaries to him by the November date. In this way, summaries of all papers except the commentaries will be published in the January issue, which appears several months before the annual meeting.

PLACEMENTS SOUGHT

The Secretary has received a communication from Reverend Martin J. Flynn of The Seminary of the Immaculate Conception, Huntington, New York, highly recommending Dr. B. J. M. Boelan, doctor of philosophy from the Higher Institute of Philosophy of Louvain. Professor Boelan's dissertation, *Eudaimonie en het wezen der Ethiek* has been printed by the Institute. He taught philosophy in Holland with much success. His vigorous opposition to Communism made him subject of such severe attacks as to endanger his life and to lead to his emigration from Holland. He is at present a visiting lecturer in philosophy at St. Mary's College, Winona, Minn.; he has the highest of recommendation from Rev. Dr. L. De Raeymacker, President of the Higher Institute of Philosophy and from Monsignor Bernard Mangan, Chancellor of the Diocese of Winona. Dr. Boelan speaks fluent English. He may be contacted directly at St. Mary's College. The Secretary is also in communication with several American scholastics of the highest standing who are seeking summer session appointments.

CARDINAL MERCIER CENTENARY

The University of Louvain is making extensive preparations for the observance of the centenary of the birth of Cardinal Désiré Mercier in October. A number of our members who are Louvain alumni are on various arrangement committees; Rev. Alan Glynn, O. F. M. has been appointed official representative of our Association for the various functions being arranged.

CHARLES A. HART,
National Secretary.

The Catholic University of America,
Washington, D. C.

Book Reviews

Early Medieval Philosophy. **By George Bosworth Burch. New York: King's Crown Press, Columbia University, 1951. Pp. viii + 142, with index. $2.25.**

In a field on which the English literature is meager this interesting little book, modest in scope and in aim, makes a distinct contribution. It professes to deal with the philosophy of the early medieval period, here taken to extend from the early ninth to the late twelfth century. Its title is a bit misleading. The work is not a history of philosophy, in the usual sense of a continuous account. Rather it is a series of five essays on as many important figures in the thought of the period in question. It might with greater accuracy have been named "Some Intellectual Leaders of the Early Middle Ages."

Given a highly selective account, there is no surprise in regard to the first three men chosen for consideration. John Scotus Erigena, St. Anselm, and Abelard could certainly not be omitted in any discussion of the philosophers of the ninth to the twelfth centuries. The choice of the last two is a little more unexpected. Though St. Bernard is certainly one of the outstanding men in the religious life of the first half of the twelfth century, he is ordinarily not considered a philosopher at all, but rather a mystical theologian. His inclusion would indicate a very broad acceptation of the term "philosophy." It seems to be taken to mean any penetrating or analytical quest of fundamental principles, regardless of their source. In St. Bernard the principles are nearly all drawn from divine revelation, and their application is almost exclusively to man's supernatural life. Yet "the only strictly philosophical" work of St. Bernard in the author's opinion is his *De gratia et libero arbitrio* (p. 90)!

The choice of the fifth man is, from one point of view, even more surprising than that of St. Bernard. Isaac Stella, the subject of this fifth essay, is usually not even named or is at best given only a passing mention. This traditional neglect occasions the surprise at his selection. On the basis of his doctrine, however, he merits to be included among philosophers much more than St. Bernard. Though Isaac is a mystical writer, he must be called a speculative or philosophical mystic. He is shown in the present work to have a penetrating metaphysical mind.

The attention drawn to him and the exposition of his doctrine is perhaps the most valuable contribution of this book.

Were we to look for a general exposition of the intellectual life of the period embraced and a true perspective of its chief figures, the omission of the theologians Peter Lombard and Hugh and Richard of St. Victor, of the humanist John of Salisbury, and of the philosopher Gilbert of La Porrée could hardly be forgiven. But nothing beyond its pretensions must be asked of this work.

No claims are made by the author for originality and deep scholarship in this work. But he does profess to work from first-hand knowledge of the works which he is exposing; and ample evidence of the truth of this claim is given throughout.

The interpretations given, however, are not entirely free from the influence of a tradition which is sometimes distorted. Erigena is held to be a rationalist and a pantheist. The so-called rationalism is recognized, however, to be of a very peculiar kind which strongly affirms the limitations of human reason and begins with an acceptance of revealed truth. The accusation of pantheism, following many admittedly bold and exaggerated expressions used by Erigena, does not take sufficiently into account his insistence upon true creation from nothing and the distinction of creatures from the creator.

In minor details there are a few astonishing misreadings of history. To identify the Church in England with the king at the time of St. Anselm and say that "the English Church did not acknowledge the supremacy of the pope" (p. 33) is an anachronism by more than five centuries and an exaggeration even of the position of William Rufus. To say that Abelard was acquitted at Soisson (p. 67) just because he was (on the scanty evidence we now have) apparently not formally charged with heresy is to suppose that there could be no lesser condemnation. That Abelard's works were considered near heresy or smacking of heresy is shown by their condemnation to burning and their author's supposed imprisonment at St. Médard—events reported in this book itself. The contention that "knowledge has been the center of interest for philosophers since the eleventh century" (p. 31) overlooks the strong ontological bent of the thirteenth century, to say the least. Similarly the judgment that "the history of medieval philosophy is the history of the failure and gradual abandonment of faith's search for understanding" (p. 47) seems to accept Ockham's verdict as definitive. It would, however, require much qualification to keep it from meriting simple rejection as false.

The book is well edited and attractively published. Only one typographical error caught the eye of the reviewer: an unclosed parenthesis on p. 15. The placing of footnotes at the back of the book is not nearly so desirable as having them on the page with the text; but no doubt this procedure was adopted for reasons of economy. Citation merely by volume, column, and section of Migne without the title of the work and its internal references is much less satisfactory than reference to the work itself with its own divisions before the data of the edition used. The bibliography omits from its general references the *Archives d'histoire doctrinale et littéraire du moyen âge.*

The minor defects mentioned do not seriously detract from the general excellence and utility of this valuable little book. It is a commendable presentation of its matter that can be recommended to students of medieval philosophy or to anyone seeking knowledge of medieval thought prior to the thirteenth century.

R. W. Schmidt, S. J.

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West Baden Springs, Indiana.

Elements of Analytic Philosophy. **By Arthur Pap. New York: The Macmillan Co., 1949. Pp. xv + 526, with index. $4.00.**

This is an exceedingly well-written and interesting textbook of philosophy by a rather moderate logical empiricist, who, while agreeing with the other members of the school in their main tenets, shows not a little originality in particular points. A detailed examination of such a work would necessitate a discussion with the logical empiricist school on the many points which are touched upon in this book; as this cannot be done here, I shall limit myself to a description of the content, to a mention of one selected problem, namely that of ontology, and, finally, to some marginal remarks.

(1) There are 17 chapters in the book. After a "Preliminary Orientation" (pp. 1-19) in which the author discusses the subject of metaphysics, ethics, esthetics and social philosophy, he starts—curiously enough—with "Some Problems of Value Theory" (23-65) which are all, in fact, problems of ethics. Then he goes immediately to the problem of universals, treated in two chapters (66-91). A short inquiry into sensationalism and innate ideas follows (92-97), then another on the nature of formal discourses (99-118). The five following chapters

are devoted to questions belonging to epistemology (perception, empirical knowledge and certainty, probable inference, causality and scientific explanations, pp. 119-262). For reasons which are not quite clear to the present reviewer this train of thought is interrupted by a long (and interesting) chapter on the mind-body problem (263-303). Then, epistemological questions are again discussed: Analysis of Meaning (304-343), Theories of Truth (344-379) and the Problem of the Basis of Scientific Knowledge (380-401). After that we find an important chapter on Metaphysical Presuppositions of Science (402-444) and another, not less important, on the Nature of Logical Analysis (445-476).

This enumeration will be sufficient to show that the author treats practically all the main problems a logical empiricist can treat at all; it does not show, however, that he treats them also in as nearly Aristotelian a spirit, as his principles will allow him. A most remarkable thing in this book is e. g. a thorough-going realistic attitude with evident lack of sympathy toward the older, verbalistic variety of logical positivism. Professor Pap is an up-to-date logical empiricist; he keeps in line with the progress achieved e. g. by such thinkers as Professor Carnap and Professor Hempel in the celebrated eleventh issue of the *Revue Internationale de Philosophie*. This means, above all, that many questions which were once declared to be pseudo-problems are again discussed. The problem of universals—where the author seems to hold a position not very distant from classical Platonism and the mind-body problem—where he appears to be a partisan of the dualistic theory—are good instances of his philosophical attitude.

(2) And yet Professor Pap remains, on the main, a faithful partisan of the school: his book is full of deprecation of metaphysics, as a good positivistic book should be. Moreover, the author undertakes to prove in detailed manner that ontology does not exist. As this is a rather important point, I shall try to report his arguments and say what I think of them.

The author examines here the traditional (Aristotelian) categories. He states that each sentence containing the name of a category can be translated into a corresponding syntactical sentence. Thus "to say '*wood is a substance*' is to say that '*x*' [in the propositional function '*x is wood*'] [1] is an individual variable" (409); "to say that color is a property of properties of individuals is to say that '*P*' [in the proposi-

[1] Words included into square brackets are added by the reviewer.

tional function '*P* is a color'] [1] is a property variable" (*ib.*) and so on. Consequently, we learn that categories ("names of categories" would have been more correct; there are many such slight incorrectnesses of speech in the book) are pseudo-predicates, which is Professor Carnap's early doctrine about pseudo-syntactical sentences. The following justification is offered: All sentences containing [names] [1] of categories are either meaningless or true; now this is not the case with true predicates; *ergo* the [names of] [1] categories are not true predicates.

To this the author raises, however, the following objection: one could form a language in which this would be true of *all* predicates. E. g. we could have a language in which "*x*" in '*x* is red' could be meaningfully substituted only by names of red bodies, and in "*x* is an animal" only by names of animals. But, says Professor Pap, the question whether a given name is or is not a name of an animal would still be a question of experience, an empirical problem—while the problem of knowing whether something is a substance or a relation is not (412).

I would say here that Professor Pap's empiricism is not thoroughgoing enough. I would be inclined to go farther than he goes and to assert that the problem of knowing whether something is a substance *is* an empirical problem. What offers here a difficulty and makes many philosophers blunder—nay, makes them fall into a kind of diluted Kantianism—is the fact that the experience on which our knowledge that something is a substance or a relation is based, is a very generic and elementary one, an experience which has been and must have been acquired before we learned more specific properties of things, and one which is presupposed in other experiences. The generality of this experience is so great that our knowledge of categories looks indeed as if it were *a priori* or a pure convention. But it is not so.

There can be no question about admitting the second alternative. It is *not* a question of convention that we use a *meaningful* word, such as "frog" always as an argument and never as a functor, as, say, a dyadic relation-name. We use it that way because we *know* that a frog is not something which could function as a relation, but only as a (real) subject.

The obvious objection to this position is that it is enough to know what, say, "frog" means, in order to know that it is a substance, while it is not enough in order to understand that it is a vertebrate animal. But I believe that this "obvious" objection is obviously wrong and I would say that the situation is exactly the same in both cases: if you do not know enough of the anatomic properties of the frog, you will

not know that it is a vertebrate animal; exactly in the same manner, if you do not know enough of its ontological properties, you will not know that it is a substance. Only, *every* knowledge of a thing carries with it a knowledge of its category, while we need more experience in order to know its other, more specific properties.

It is also not true, as Professor Pap says, that categories, being the most generic names, carry no meaning at all. Categories are *not* the most generic words; such a word is only one, namely "being" (and its equivalents). And "being," if taken as a name of the *summum genus*, is truly meaningless—"void" as Hegel would have it. Categories already carry with them a determination: they have properties which distinguish them from other categories.

Another possible objection is the following: the categorical structure of reality is adequately mirrored by every full language; if so, ontology may be completely substituted by syntax. This is, of course, true, provided that the *whole* of ontology be actually mirrored by a language. But the same is true of *every* science. To each a corresponding syntax may be constructed in the way suggested by Professor Pap himself. Only an extreme verbalist would say—e. g. if an adequate language for the theory of colors were available—that theory would be just the syntax of that language. I wonder why he becomes a verbalist in respect to categories which are only in degree and not in nature different from other concepts.

I would like to express still another opinion. A part of ontology *has* been rigorously formulated; every one can find it e. g. in the *Principia Mathematica*. It is true that the content of that work is currently called "logic"; but most certainly it is not logic as understood by scholastic philosophers. Their logic dealt with *entia rationis*, while the *Principia* deals with being in its (analogical) universality. Now the content of the *Principia* may be translated into a meta-language; it might be constructed as a pure syntax. Such syntax would be the linguistic counterpart of ontology contained in the work. Nevertheless, I do not believe that this syntactical system would render the present form of the *Principia* useless. On the contrary, there seems to be little chance that any one (excepting the speculative logician) would prefer to use it instead of the so-called "logical" i. e. ontological original system. It is true that the *Principia* does not contain the whole of ontology; e. g. the categories are used, but not treated there. Yet, of a system of categories the same could be said as of that part of ontology which is contained in Whitehead's and Russell's work, namely, that it

can be exactly formulated, that a corresponding syntax could be constructed and that such syntax would by no means supplant the original system.

(3) I pass now to some rather extrinsic remarks about the way in which the book is written. I already pointed out that its style is rather loose; which may be understood if we realize that the author wrote for beginners and that too much exactness would hurt them. Yet, the present reviewer does not see why, e. g., the corners should appear as a kind of *deus ex machina* in the chapter on the Mind-Body problem (p. 289) only to disappear after that. Several places in which use and mention are confounded could be easily corrected. Another kind of correction would also be welcomed. One does not see why an analytical philosopher should use aggressive language; and, as a matter of fact, nothing of that sort is to be found in the writings of the leading thinkers of the school, say Professor Carnap or Professor Tarski. Professor Pap, however, is not only aggressive, but even offensive about religious matters. A text which I do not hesitate to call very offensive to Catholics is that in which he touches (without any need) upon the Immaculate Conception (p. 302). It is, of course, free to anybody to think what he likes about our beliefs; but the least we can ask for is that the author might consult an elementary dictionary before writing such nonsense as Professor Pap does here. It is really a pity to find such things in a scientific book; far too many "philosophers" believe today that in order to philosophize rightly one must love and hate and slander; but it would be rather strange if Professor Pap would agree with that "theory." I hope therefore that those are *lapsus calami* which will be corrected in the next edition of the work.

For an excellent work it is. It has been said of Cajetan that even when he blunders, there is more pleasure and profit in reading him than in reading others who say the truth; and perhaps, *si comparare licet* something of the sort can be said also of this book.

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The Guide for the Perplexed: Moses Maimonides. **By Leon Roth. London: Hutchinson's University Library. New York: Longmans, Green and Co., 1950. Pp. 141, with index. $1.60.**

The Legacy of Maimonides. **By Ben Zion Bokser. New York: Philosophical Library, 1950. Pp. ix + 128, with index. $3.75.**

Here are two introductions to Moses Maimonides. We meet here not primarily the honored Rabbi Moses who is glimpsed through the writings of St. Thomas, but rather the bold scholar whose work stirred up violent controversy in the Jewish communities of Spain and France. Both books show how Maimonides answered the twelfth-century challenge of the problem of faith and reason.

Roth's title might lead the reader to expect an edition or translation of *The Guide for the Perplexed.* The book is, instead, a general introduction to the life, works, and historical role of Maimonides, with special stress upon the contents of the *Guide.* The *Guide* is not treated as an isolated masterpiece but in its relation to the rabbinical writings that constitute landmarks in the history of Judaism: Maimonides' *Mishnah Commentary* and *Mishneh Torah* or *Code.* Of these two great works on Jewish law the first, Roth shows, is a work of scholarship rooted in the past; the *Code,* a work of systematization, lays down rules for the present. The *Guide* is a book of apologetics that reveals explicitly the rational foundations of both the *Code* and the *Commentary.* It is directed not to the unbeliever or sceptic, but to the intelligent and educated believer who cannot quite reconcile his philosophical knowledge with the literal meaning of Scripture. The principal issues discussed in the *Guide* are sketched in the central part of Roth's work.

Roth's book does not pretend to be a scholarly monograph, but only a broad outline, simply expressed. It achieves that aim, but at times the reader might wish for more careful analysis. For example: In a well-meant effort to restore prestige to the great thinkers of the "dark ages," Roth says that "they based their all on science" (p. 15). To unify and order the results of the various sciences was, for them, philosophy's function (p. 14). This dubious compliment makes mediaeval philosophy pose as the handmaid of science. Omitting all mention of *esse,* it would, in effect, reduce Thomistic philosophy to a synthesis of Aristotle's cosmology.

Another difficulty is this two-fold assumption: (a) that Aristotle and the Neoplatonists taught that God is Being and the cause of being; and (b) that Maimonides owed to them this insight. But no evidence

is presented for (*a*). And on (*b*): though there was an impact of Greek thought on Maimonides' view of God, it is not in this insight that the impact is clearly discerned. To gain an awareness of God as primarily Being, the great Rabbi Moses need not have looked further than the *Ego sum qui sum* of *Exodus* iii: 14.

The Legacy of Maimonides by Bokser is less general in its scope than Roth's book and more closely unified around a single theme: Maimonides as a conciliator of two seemingly opposed world-views: the Greek and the rabbinic, the philosophical and the religious. After stating the problem and giving a brief biographical sketch, the author shows the rabbi at work in his role as a mediator who treats of the existence and nature of God, the relation of religion to culture, man's place in the universe and man's *summum bonum*. Though the *Guide* is the principal source for this study, other works of Maimonides have also been used.

Bokser's work gives the reader a brief but coherent, well-ordered approach to Maimonides' thought. Yet here, as in Roth's work, some points that are minor in relation to the author's main purpose need further precision. Bokser says, for example, that many Moslems, Christians, and Jews proved the existence of God by arguing that a created universe necessarily implies a creator (p. 24). He wishes to show that Maimonides refused to accept this proof "because in some respect it begged the question" (p. 25). Since an adequate account of the proof is not given, the reader cannot help but wonder whether it is the proof or its synopsis that begs the question.

Another dubious point is basically the same two-fold assumption we have met in Roth's work. Bokser believes: (a) that Aristotle affirmed "the existence of a God who was the beginning and the end of all existence" (p. 13); and (b) that Maimonides owes to Aristotle the insight that there is a supreme Being who has absolute existence (p. 32). It is strange that two such scholars as Dr. Roth, professor of philosophy in the Hebrew University of Jerusalem, and Dr. Bokser, lecturer at the Jewish Theological Seminary, seem unaware that their own great religious tradition could have helped men to see that God is Absolute Being.

Neither book is chiefly concerned with Maimonides' influence on Christian thinkers. Thomas Aquinas is mentioned only once by Bokser, but the report (pp. 20-21) of Maimonides' account of why metaphysics should not be studied by all will suggest to the reader St. Thomas' texts on why those metaphysical truths that are needed for salvation

have been revealed: the many chances of error, the confusion arising from imagination, unsuitability of temperament for a life of study, the need of a long preliminary education, the impulsiveness of youth, mundane interests and distractions. (N. B. P. Synave, in "La révélation des vérités divines-naturelles d'après saint Thomas d'Aquin," *Mélanges Mandonnet.* Paris: Vrin, 1930, I, pp. 327-370, gives an interesting comparison of Maimonides' and St. Thomas' texts on this question.) Roth points briefly though explicitly to St. Thomas' debt to Maimonides in admitting the logical possibility of the eternity of the world (pp. 85-86). He does not show, however, the contrast between their views. Though the two philosophers agree (1) that it is impossible to demonstrate the beginning of the world in time, and (2) that it always remains possible to deny the eternal existence of the universe, yet there is a point of distinction. For Maimonides both creation and creation-in-time can be known only through revelation. For St. Thomas creation can be known by demonstrative reasons, but that it is creation-*in-time* is known only by revelation. (Cf. Gilson's comment in *Le Thomisme.* Paris: Vrin, 1948, p. 213.)

Both books see as the central thread of Maimonides' work the attempt to reconcile the Greek and rabbinic traditions. Both point to the violent controversies that burst forth after Maimonides' death between Maimonist and anti-Maimonist factions. Some saw in Maimonides a great scholar who had provided a strong intellectual defense of Judaism; but others were alarmed at what seemed like a rationalizing view of the Biblical text, of miracles, prophecy, and man's destiny. The storm that arose in Provence in the Jewish community was cut short in 1306 by the expulsion of the Jews from France, but it was revived for a time in the nineteenth century. While both Bokser and Roth find in Maimonides a blend of Judaism and Hellenism, of religion and philosophy, Roth lays greater stress on the intellectual and rationalistic side, whereas Bokser stresses more the religious side of Maimonides. Roth says that "for Maimonides religious truth *is* philosophical truth, howbeit adapted to ordinary comprehension" (p. 132) and that "he declared . . . sheer knowledge to be the highest element in the religious life" (p. 79). Bokser shows that since for Maimonides the universe, amidst all its rationality "is permeated with mystery, which our little minds cannot unravel" (p. 37), reason though precious, is insufficient to guide us; we need also divine revelation (pp. 23, 109-110).

The Christian philosopher will not agree with several aspects of Maimonides' thought: the completely equivocal character of our names

for God; the restriction of Providence to man; the unity of the Agent Intellect; the rationalistic account of prophecy; the implication that philosophers *qua* philosophers are, of all men, necessarily the nearest to God. But he will find it of interest to see in these books the work of the great Rabbi Moses on the problem of faith and reason.

BEATRICE H. ZEDLER.

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Dante the Philosopher. **By Etienne Gilson. Translated by David Moore. New York: Sheed and Ward, 1949. Pp. x + 338, with index. $4.00.**

At the appearance of any new book on Dante, together with a feeling of interest and expectancy, we experience one of skepticism and suspense. Problems and solutions considered and reconsidered come to mind together with intricate questions about familiar characters, problems of history, of literary critique, and of exegesis. These difficulties which we have learned by experience almost impede us from taking up a new book dealing with the interpretation and synthesis of Dante.

Gilson's book *Dante the Philosopher* recommends itself from the beginning with an alluring title which, however, does not exactly reproduce the idea contained in the title of the French edition, *Dante et la philosophie,* which certainly is more in accordance with the author's exposition. It was Gilson's mind in fact to treat of Dante from a determined point of view: namely, in his relation with philosophy, as he says in the preface: "The object of this work is to define Dante's attitude or, if need be, his successive attitudes toward philosophy" (vii). Dante is such a complex personality that only by proceeding from determined and circumscribed viewpoints can one hope to reach a fairly comprehensive conclusion.

The first part of the book on the contrary is somewhat disconcerting. At the first approach the reader thinks he is faced with one of those communal contests of dialectic virtuosity in which the author obtains an easy victory over his opponent, but unfairly, one might say, for P. Mandonnet's interpretations and exegesis have already been criticized and long disaproved. Very soon though, he realizes that this display of dialectic virtuosity is for Gilson only the springboard from which his personal and original thesis on Beatrice, philosophy and

empire together with all their interrelations, expands with admirable clarity and precision. In this work Gilson is like a wise restorer of medieval and classical edifices; he tears down baroque superstructures added by sacrilegious hands and shows the original make-up in all the purity and clarity of its classic lines. More than anything else, one fundamental point has to be admired in this new essay on Dante. A great principle of interpretation is set forth by the author, to which he adheres conscientiously throughout the extension of the book: "It is more important to understand Dante than to classify him" (p. 127). At last! Others, and there are scores of them, have looked more for a classification of Dante rather than for a real interpretation and understanding of him, thus putting on Dante ideas that are their own.

There is another point with which we must credit Professor Gilson. In attempting to understand and interpret Dante's Beatrice, he has capitalized on the chivalrous spirit of Dante's time and its influence on literature. "Dante," Gilson rightly says, "loved Beatrice primarily as a chivalrous poet of his time loved a lady of his time" (p. 57). I believe that the author has really found the point when he explains Beatrice's exaltation and the way of it, from Dante's love for the beloved lady, which is one of the most characteristic and beautiful aspects of the literature from the twelfth to the fifteenth century (p. 55). Dante himself hints at this reason at the end of the *Vita Nuova.*

> Appresso a questo sonnetto apparve a me una mirabile visione, nella quale io vidi cose che mi fecero proporre di non dir più di questa benedetta, infino a tanto che io non potessi più degnamente trattare di lei.

This idea of simply glorifying Beatrice in a poem, however, in the course of time and through a process of spiritual crisis has been inserted in a more ample and universal politico-theological plan of doctrinal and moral teaching. To have taken into consideration this characteristic element of medieval literature enabled Gilson to give us Beatrice's historico-artistic figure in a masterly synthesis. He has thus avoided those "ultra and infra Beatrices" (p. 57) for whom so many Dante students have yearned. In his interpretation of Beatrice, Gilson has kept the golden mean, showing us a Beatrice "born of the genius of Dante to which the Bice Portinari is an historical personage whose shadow discretely accompanies the eternally living Beatrice whom Dante alone has created" (p. 53).

Following this comes the discussion of the most debated question which concerns the pretended Averroism or Thomism of Dante, in connection with the other problem of the empire and its relation to the

Church, and the implicated questions on the relation between philosophy and theology. Here too Professor Gilson earns great merit in giving us a personal Dante, as he certainly was, without hurrying to classify him with either the Thomists or the Averroists. Dante is Dante, although he may use the authority of both schools. The part they play in the *Divine Comedy* is to make his ideas acceptable. Thus the tale that Dante is a Thomist seems to fall once and forever, or as Gilson puts it: "Dante's doctrine has the uniform flow of original thought" (p.222). Now the question arises, "How much is Dante not a Thomist and how much is he not an Averroist?" In the distinction between the provinces of faith and reason, philosophy and theology, emperor and pope, according to Gilson, Dante has gone a step further than St. Thomas. The poet, however, withholds himself from passing to the opposite side of the Averroists, putting emphasis on a new element ignored by them; namely the ultimate dependence of both orders on God. In Dante's mind St. Thomas and Siger of Brabant are the two champions, who fought, each in his own way, for the independence of these two orders, and he feels himself between the two, supported by both.

Some important points still seem obscure.

1. We had rather expected Gilson to comment on Dante's attitude toward Archbishop Stephen Tempier and his condemnations of Siger of Brabant in 1270 and 1277. How is it that Dante, a "typically Christian minded man," did not respect the ecclesiastical authority of Paris which condemned Siger as a heretic? Has he perhaps attempted to glorify a heretic in spite of the Church's definition? Or was this condemnation considered by him to be another intrusion by the ecclesiastical power into a province not its own? The plea of ignorance concerning Siger's life and works, we are told by Gilson, cannot be introduced. Dante certainly knew Siger's doctrine and the vicissitudes of his life when he wrote of him: "Sillogizzo gli invidiosi veri."

This problem is even more puzzling when we consider that in analogous cases Dante behaves in exactly the same manner. The emperor Trajan is placed in Paradise. Certainly there is in Dante's mind something more than the reason found in the medieval tale where St. Gregory saves him by his prayers. Yet Trajan is a pagan emperor and a persecutor of the Church. (Par. XX, 44-55; 112 ff., Purg. X, 73-93.) The emperor Manfred, one of the bitterest enemies of the Church and notorious in history as a robber of ecclesiastical goods, passes into Purgatory pratically saved (Purg. III, 112). So it is with Joachim de

Fiore, who, though excommunicated by the Church, is nevertheless in heaven (Par. XII, 140).

2. The author has certainly cast aside many explanations of the past as outmoded. I refer to those interpretations which classify Dante as either an Averroist or a Thomist. According to Gilson, Dante is neither, but has a "typically Christian" theory on the empire and the Church, on philosophy and theology: "a theory exclusively his own" (p. 221). Yet a little further on he maintains that the *Monarchy* was removed from the *Index* because "it was *simply* considered that political conditions had altered sufficiently for the doctrine to have lost much of its virulence," and he adds: "little imagination is needed to conceive conditions under which the book might recover it [its virulence]." I believe that a vivid imagination is required to conceieve a "typically Christian" treatise with such a "virulence." Gilson says nothing of the fact that Benedict XV in his encyclical on Dante quotes mainly from the "virulent" monarchy. Indeed, he does not even mention such an authoritative adversary.

3. We are convinced that Dante as he grew in age and experience passed through a process of spiritual adjustment, approaching more and more to the view of St. Thomas on the question of empire and Church. If we compare the *Divine Comedy* with the *Banquet* we find some remarkable differences. True, it is Aristotle who guides Dante in the *Banquet*. In the *Divine Comedy*, however, Virgil assumes this role, acting as the messenger and ambassador of Beatrice, receiving power and authority from her at the most difficult points of the journey. Moreover, Virgil reserves the solution of many questions for the moment in which Dante will see Beatrice. Considering Beatrice herself we see that she has been elevated to such a height that it is hard to believe that Dante has not entrusted her a symbolical part to play in the Drama, possibly that of divine grace. Other actors: St. Thomas, St. Bonaventure, St. Albert the Great have tasks proportioned to their actual spiritual stature. Why is Beatrice the only exception? Seemingly she is the only one performing such an unproportioned part. Is this change of scenery and characters nothing to Professor Gilson? Or are we to discern here Dante's approach, after mature meditation, to the Thomistic thesis on the relationship between philosophy and theology, Church and empire, with Beatrice playing the part of divine grace and possibly of theology?

4. The fact that Dante makes Thomas praise Siger and moreover

that he places him in heaven, should not cause much trouble. Gilson, I think, has overlooked an important characteristic of Dante's poetic license. The poet takes pleasure in showing how different are God's judgments from ours, and how many surprises they hold for mortals. So he judges men, when need be, with a quasi-divine knowledge taking into account their intentions as well as their deeds, which alone are seen by mortals. He can claim this knowledge since he is travelling through their eternal and unchanging habitations. Now Siger's intentions in defending the independence of philosophy from theology were certainly right. Those of St. Thomas in safeguarding the supreme dominion of revelation over philosophy, pope over prince, were also right. Thus holding Siger's distinction and independence at one side, and the relations stated by St. Thomas at the other side, Dante achieves a golden mean between separation and confusion.

With these remarks, though we do not intend to impair the great work achieved by Professor Gilson in reading and interpreting a poet whose language is not his own; we want only to note that some problems are still open for further discussion and await a solution.

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La Pedagogia di Giovanni Dewey. **By Gino Corallo, Turin, Italy: Editrice Internazionale, 1950. Pp. xlix + 557. Lire 2000.**

It is no surprise to the unbiased and well-informed American student to state that the criticism of J. Dewey's thought on the part of European thinkers has been, in the main, a thoroughly destructive one and, no doubt, far severer than any levelled by Dewey's adversaries in this country since the date of the philosopher's early publications. However, most of the critics have either laid too great an emphasis upon Dewey's philosophy as if it *had* a metaphysical basis, or dismissed the whole of his philosophico-educational conception disregarding valuable educational achievements.

Father Corallo, a Professor of Educational Philosophy at the Catholic University of Milan and at the Pontificium Athenaeum Salesianum of Turin, Italy, is a first-rate philosopher, a theologian, and an expert educator. He has read widely and thoroughly in American educational literature, and has spent several years in a minute study of each one

of Dewey's writings. His massive book represents a real achievement in the field of criticism philosophical as well as educational. I am sure the scholar will not fail to find in Fr. Corallo's study a balanced acknowledgment of the two previously mentioned aspects. Father Corallo, in the course of over five-hundred pages, cross-examines the supposedly metaphysical foundation of Dewey's philosophical construction and only after a detailed and painstaking analysis of the major works of the philosopher pronounces his negative verdict. Notwithstanding, he is convinced that *some* of the practical principles promulgated by Dewey, the educator, if freed from their inconsistent philosophical background and brought down to life with poise and wisdom, represent a valuable step forward.

There is, however, a third merit implicit in Father Corallo's treatment, and this is the strictly logical reconstruction of the whole philosophico-educational system, as it logically coalesces in Prof. Dewey's mind, and, so far as possible, in Dewey's own terms. The striving for a strictly objective interpretation of Dewey's "ambiguous" thought (Fr. Corallo is not the only critic to be puzzled by Prof. Dewey's chameleon-like views) is plainly evident from the wearisome labor of marshalling, comparing, and sifting numberless passages, in which the writer tries to grasp a supposedly unvarying idea through ever varying expressions. Such interpretative work results in a faithful exposition of the philosophical background of Dewey's educational thought, and is condensed by the author—not without some inevitable repetition—in the first 480 pages of his book. In this first section, divided in five parts, he inquires into the fundamental aspects of Dewey's philosophy together with their educational derivatives. In a preliminary part, the essential nature of Instrumentalism is brought out and shown in connection with the "New Education." Subsequently, basing himself on Dewey's statement that the two foundations of education are psychology and sociology, Corallo turns his analysis upon the Deweyan concept of human nature and its role in the community. On the former is grounded Dewey's psychology of primary education, and his views concerning interest, effort and discipline, work and play, curriculum construction, and the methods of the "new schools." Upon the latter is based the idea of education as a social function, and the essentially democratic nature of the educative process. Owing to its far-reaching consequences, the metaphysical outlook inherent in Prof. Dewey's theories is of supreme importance for the critic. Hence Part IV of the book hits the climax in the development of Father Corallo's study. The instru-

mental concept permeates Dewey's idea of reality and thought, and tinges the universe with the shading hues of relativity and change. It seems—Father Corallo remarks—that Prof. Dewey is trying again and again to avoid positing absolutes, but at the same time he is somehow led by a tricky logic unconsciously to raise to an absolute value what he postulates as relative. Such is the case with "change," which is, on one hand, conceived as relative, but, on the other hand, posited by Dewey as omni-present, universal, and constant: the objectively unifying element in the cosmos, and therefore *the* Absolute! Part V deals with the application of Dewey's essential relativism to the problem of human action: the resulting disruption of any stable ethical basis makes his ethics unethical. Mention is also made of Dewey's mechanistic theory of art and nebulous concept of religion.

The remaining one-hundred pages, which make up Part VI, represent the highlights of the author's criticism. Through an elaborate and organic process of valuation he evinces the presence of a genetic nexus between what he calls an "*ethicoeducational contingentism*" and Prof. Dewey's "*empirical phenomenalism*": the former is a necessary derivation of the latter. It would lead us too far afield if we were to review each critical remark of the author. Suffice it to mention the two major points of emphasis in Father Corallo's critique.

1. *Metaphysical insufficiency of Experimentalism.*—The reducing of all items of reality to the spurious category of "natural events" unmistakably classifies Dewey's system as *strictly monistic*. Such monism, however, is not anchored on anything firmly subsistent, but is floating on and drifting along with the waves of the phenomenal world: it is "a *phenomenalism* naïve and uncritical, which stops at the appearing data inasmuch as appearing, not, however, as a possible attainment of a quest, but simply as materials for an interesting description" (p 487). Dewey, in line with this emerging note of phenomenalism, has stressed time and again the principle that nature must be *described*, not given prescriptions: in other words, the philosopher is not expected to pierce the shell of reality in quest of a mysterious "noumenon," but merely to take the appearance of reality at its face value. "Now this seems to be an irrefragable negation of any possible philosophy" (*ibid.*). It goes without saying that a philosophy which systematically appeals to the data of the physical and biological sciences and draws its main conclusions from experiential sources that are totally "inside" the frame of the cosmos, cannot but be relegated to the realm of the *materialistic* systems. Now, can we speak of Experimentalism as genuinely

metaphysical? The answer must be negative. For it is no metaphysical knowledge to resolve all concepts into a mere description of the surface of reality, which is necessarily varying and contingent, and therefore of no absolute value, nor is it a metaphysical attitude that of being constantly tied up to the concrete experiential datum as the only procedure for critically validating human knowledge. Dewey's system is, therefore, not a metaphysical vision but a mere "*methodology*" of research and action. In fact—asks Father Corallo—"what is the meaning of his principle that 'one must look at the role of things, not at their structure'?" (p. 492) Hence, "we can conclude from what has been said that in Dewey there is wanting a philosophical work-out of concepts, which are taken up 'in toto' from the positive sciences and frequently, with ostentatious preference, also from the common usage" (p. 494).

2. *Intrinsic inconsistency of the system.*—The inconsistency, which is frequently pointed out by Corallo even while merely expounding the content of the system, offers two aspects. It appears, first, as a far-reaching and inter-twining chain of logical circles or "petitiones principii." Dewey is continually going round and round within sets of mutually postulating premises and conclusions, without ever arriving at a definitive formulation. Because of the lack of an absolute "point d'appui," Mr. Dewey is only too often begging the question unknowingly and undeliberately. *Salva reverentia*, we could address him in Socrates' ironic words: "After that, shall you be surprised to find that your definitions move about, instead of staying where you place them?" (*Euthyphro*). The second element of Dewey's inconsistency is the flagrant contradictoriness glaring through a number of his statements. Father Corallo has filled up several pages with quotations from Dewey's works, where what is once said with sweeping self-assurance is soon gainsaid a few lines below or in the next page with unchanged self-assurance.

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A History of Philosophy. Vol. II. Mediaeval Philosophy: Augustine to Scotus. **By Frederick Copleston, S. J., Westminster, Md.: Newman Press, 1950. Pp. x + 614, with index. $4.50.**

A Short History of Western Philosophy in the Middle Ages. **By S. J. Curtis. Westminster, Md.: Newman Press, 1950. Pp. x + 286, with index. $3.25.**

Reviewing two such histories as these imposes an immediate choice on the critic: he must either do the job in merely cursory fashion or in some detail. In the present instance it is difficult to decide because neither work is offered as a piece of technical research but as a general or introductory treatment of its subject. So Fr. Copleston tells us (p. 8) it is not his purpose to narrate "all the known opinions of all known mediaeval philosophers"—he is not presenting an encyclopedia of mediaeval philosophy. But on the other extreme he intends more than a mere sketch or a series of impressions. He has sought for a compromise between these two extremes by trying to trace out the main lines of thought—the linear interpretation, as he calls it (p. 564)—while at the same time taking care to suggest the characteristic spirits of the various schools of thought with which he is concerned. Prof. Curtis, on the other hand, has less ambitious plans, being quite content to present "a simple introduction to the history of the philosophy of the Middle Ages," intending his work for undergraduates, students in university-extension courses and the general public at large. Obviously, then, neither book is intended as a critical work. This reviewer feels, however, that instead of receiving summary treatment they should be carefully scrutinized. For undoubtedly Fr. Copleston's work will be very widely used and, in the interest of students just beginning work in the mediaeval field, small details, differences of interpretation and technical difficulties should be honestly presented.

The scope and content of the two works are somewhat different. Fr. Copleston has decided to allocate two volumes in his proposed series to the mediaeval period, and consequently he is able to devote more space to individual thinkers than is Prof. Curtis. The result is that Fr. Copleston carries his treatment only as far as Duns Scotus and proposes to take up the story from there in a subsequent volume; the latter, providing far fewer details, carries his work as far as Nicholas of Cusa and concludes with a short chapter on mediaeval mysticism that takes the work, chronologically at least, through the 15th century. In addition, Fr. Copleston is much more interested in the Patristic back-

ground of mediaeval speculation than is Prof. Curtis, and with that in mind gives a short but very useful account of the contributions made by the Fathers of the Church. Prof. Curtis is content to present only three figures whom he considers "precursors of mediaeval philosophy"—St. Augustine, the Pseudo-Dionysius and Boethius—but pays no further attention to the patristic period. Fr. Copleston adds an interesting list of honorific titles given to various mediaeval thinkers, a brief bibliography and rather detailed tables of names and subjects; Prof. Curtis concludes with a comparative chronological chart relating various mediaeval thinkers one to the other and to the main political movements of their day, an abbreviated list of St. Thomas's works and a rather inadequate index. His bibliographies are usually given at the end of each chapter and are quite useless except for the most general purposes—the main reason being, apparently, that they are confined to English titles. But even that reason is not entirely valid since many such works are also missing (for example: J. N. Figgis—*The Political Aspects of St. Augustine's City of God*; V. J. Bourke—*Augustine's Quest for Wisdom*; B. Switalski—*Neo-Platonism and the Ethics of St. Augustine*; H. A. Patch—*The Tradition of Boethius*; J. K. Sikes—*Peter Abelard*; Helen Waddell—*Peter Abelard*; T. J. de Boer—*History of Philosophy in Islam*; I. Husik—*A History of Mediaeval Jewish Philosophy*, and many more). In general the basic documentation of Prof. Curtis's book is extremely thin (thus, secondary works—Gilson, Mellone and Bréhier—seem to constitute the sources of his treatment of Ockham) and many of the quotations that are given appear without references (p. 15, p. 39, p. 40, p. 42, p. 58, etc.).

Before estimating the value of the respective books it might be well to clear the ground by remarking on a few typographical and factual errors. Thus, in Fr. Copleston's work there are a few errata that have gone unnoticed apparently: p. 1 line 24 "apologise"; p. 93 line 39 "light-motive"; p. 377 line 18 "in union rather (*than* omitted) to either of them separately"; p. 394 line 18 "materia causae"; p. 504 line 20 "an idea of the essence of (*or*?) *ratio formalis* of the attributes." And the following slips appear in Prof. Curtis's book: p. 33 line 30 "general and species"; p. 43 line 35 "The Neo-Platonic trend of this doctrine (*is*, omitted) sufficiently obvious"; p. 239 line 34 "voluntaryism."

Prof. Curtis also states (p. 80): "Unfortunately there is neither an English translation of St. Anselm's philosophical writings nor any English work dealing with the details of his philosophy," but the fact

is that the Open Court Publishing Co. has long ago taken some steps to fill that very need. Giles of Rome is named in a list of "secular clergy" (p. 116) whereas he was a member of the Order of Hermits of St. Augustine. And on p. 202 we read this statement: "by the time he (i. e. St. Bonaventure) obtained his bachelor's degree in 1245 he had definitely given his allegiance to the Augustinian tradition. He did this in full knowledge of the teaching of his Dominican colleagues, Albert the Great and St. Thomas Aquinas," but Prof. Curtis also states (p. 134) that St. Thomas entered the Order of St. Dominic in 1243 or 1244. Perhaps, then, the statement is ambiguous, incorrect, the chronology somewhat at fault. Later, in connection with Duns Scotus, we are assured (p. 218). "The *Theoremata* are generally agreed to have been written some years after his death, since they contain opinions similar to those held by Ockham." Would that it were as simple as that! And whereas it is a matter of opinion whether or not Avicenna was a more faithful commentator on Aristotle and less marked by Neo-Platonic influence than any other Arab philosopher (p. 110), the matter of Avicenna's knowing the work of Eriugena is a factual one, and Prof. Curtis presents no evidence for the statement (p. 45). Finally, confusion arising from the use of such terms as "Conceptualism" and "Nominalism" has led to this situation: on p. 50 we read, "It (i. e. Nominalism) is entirely a modern development and was never held by any mediaeval thinker," and on p. 237, "Men of his own age called Ockham a Nominalist, but such a term does not truly represent his position." Surely the "men of his own age" knew what Ockham meant or did not mean.

A few similar points should be noted in Fr. Copleston's text. Clement of Alexandria is called (p. 26) "the first Christian man of learning," and yet he is said to have followed in the spirit of Justin Martyr. Later (p. 205) Proclus is mentioned as the author of an "Elementatio Physica." The "De Intelligentiis" is attributed (p. 131) to a Pseudo-Avicenna and assigned to the middle or last part of the 12th century, apparently rejecting thereby and without discussion the manuscript designation of Adam Pulchrae Mulieris as the author. The suggested date is now said to be the first quarter of the 13th century. Wm. of Auvergne is described (p. 221) as apprehending the doctrine of analogy and it is said to be a doctrine "essential to a theistic philosophy." We can only wonder what is to be said of Scotus's doctrine in view of Fr. Copleston's long discussion (pp. 501 ff.) of the need for a univocal concept of being if there is to be a metaphysical knowledge of God. And finally, the so-called theory of the double truth is still with us—

Averroes taught such a theory (p. 198), and when presented by Averroists at Paris it seems that God miraculously performed what was rationally impossible (p. 437).

Both authors are obviously interested in finding similarities between the mediaeval doctrines they are analyzing and modern theories. Now although such similarities are useful, they are only intelligible if such modern positions are known to the reader. In fact, then, both authors are really presupposing a fairly extensive knowledge of Descartes, Kant, Hegel, Comte, etc. in people who are ostensibly fresh to the study of philosophy. More damaging, however, is the agreement such similarities imply in doctrines that are fundamentally different. For example, Prof. Curtis says, "Like Kant, Aquinas emphasizes the sensible origin of intellectual knowledge, and like Kant, too, he is aware that intellectual activity is different from sense perception." The similarity is completely negative, for we must recall that both sensation and intellection are utterly different in the two theories, and yet at first glance the statement seems to indicate an agreement between them. Another instance: Abelard's insistence upon the motive of an action in determining its moral status is called "an anticipation of Kant" (p. 66), as though that intention were a purely subjective matter, an intention that seemed good rather than being truly so. Once in a while Fr. Copleston also has occasion to make such comparisons when he speaks (p. 120) of Eriugena as "an Hegelian before Hegel" (he qualifies that statement, however, by adding that Eriugena did not realize what he was doing). And a remark like the following (p. 339) is one that few young students of philosophy will find easy to comprehend: "I cannot see, however, how an historian of mediaeval philosophy in general can justly be expected to treat St. Thomas as though he were a contemporary and fully aware not only of the Kantian criticism of the speculative reason, but also of the attitude towards metaphysics adopted by the logical positivist." In short, as introductory works they take a rather extensive historical and philosophical knowledge for granted.

Finally, this reviewer has been struck by several attitudes in Fr. Copleston's book that seem part and parcel of the philosophical equipment he himself brings to bear on the history he is writing. He hints at the outset that he is writing as a Thomist—"What historian of philosophy was or is *merely* an historian in the narrowest meaning of the term? No Hegelian, no Marxist, no Positivist, no Kantian writes history without a philosophical viewpoint, and is the Thomist alone to be condemned for a practice which is really necessary . . . ?" (p. 9). Let us see, then, what the Thomist does in Fr. Copleston's mind. A

clue to his approach seems to appear in his handling of this question (p. 393): "On the principle, *nihil in intellectu quod prius non fuerit in sensu*, how can we attain a knowledge of God when we cannot say *quod Deus prius fuerit in sensu?*" In reply Fr. Copleston appeals to the doctrine that being is the intellect's proper object and, inasmuch as God is being, He can be apprehended by the intellect. The human intellect must use the senses because of its embodied state, but intellect remains intellect—"Owing to its embodied state and the necessity of the *conversio ad phantasma* the human intellect has, in its embodied state, the sensible object as the natural and 'proper' object of its apprehension, but it does not lose its orientation towards being in general" (p. 393). It can, then, proceed beyond sensible being to see the being of God *ut causam, et per excessum, et per remotionem* (p. 394). Is this anything but one more expression of the doctrine of the common nature, both as it affects intellect and being? In spite of a few pages (pp. 332-335) devoted to the distinction between essence and existence in St. Thomas, it would seem that for Fr. Copleston being remains an essence rather than being (with the act of existing as its most characteristic note). This view seems basic to the emphasis he places on apprehension and the concept, to his notion of abstraction and the manner in which he handles abstraction in St. Augustine, St. Thomas and Duns Scotus, and to his treatment of analogy in St. Thomas. These, however, are plainly major topics and cannot be justified or developed as they deserve in a brief review such as this. And one final point: the so-called Boethean metaphysic is apparently not too well appreciated by Fr. Copleston: the composition of *quod est* and *quo est* is not even mentioned in his treatment of Boethius (pp. 101-104), it is mentioned briefly in discussing Gilbert de la Poirée but is not identified as Boethean (p. 236).

As a brief estimate, then, it may be said that Fr. Copleston's work is much superior to the result of Prof. Curtis's labors. In spite of a few understandable lapses the former's book is well prepared and a very readable account—indeed, the long sections on St. Thomas and Duns Scotus are complete enough to serve as useful introductions to the thought of these two major figures. The criticisms that have been made are intended for readers of a more technical turn of mind, not for those entering the field for the first time. For these latter, Fr. Copleston's work will prove both helpful and informative.

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The Index of THE NEW SCHOLASTICISM and the PROCEEDINGS is being held up by the lack of only Volume XIV #3 of THE NEW SCHOLASTICISM, and Volume VI of the PROCEEDINGS.

If you have either of these, please communicate with the Business Manager.

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To those who have replied to our request for back numbers, we wish to express our appreciation.